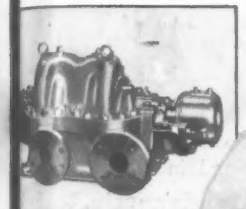
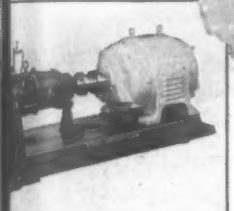
the OIL AND GAS JOURNAL

158 NEW HIGH OCTANE UNITS GO On Stream

DOUBLE CASE HOT OIL PUMPS



IPLEX PUMPS



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BYRON JACKSON PUMPS

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SEPTEMBER 2, 1944

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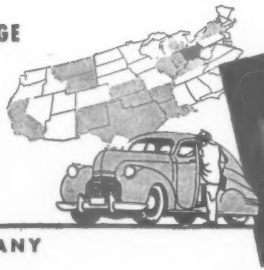

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Type of Fitting	Description	Standard Weight	Extra Strong	Schedule 160	Double Extra Strong	Light Gauge Nominal Pipe Size	Light Gauge Iron Pipe Size
Elbows	90° Long Radius	½"-24"	¾"-24"	1"-12"	1"- 3"	4"-24"	3"-12"
Elbows	90° Short Radius	1"-30"	1½"-30"				
Elbows	45° Long Radius	½"-24"	¾"-30"•	1"-12"	1"- 8"	4"-24"	3"-12"
Returns	180° Long Radius	1"-30"	1"-24"	1"-12"	3"- 8"	4"-24"	3"-12"
Returns	180° Short Radius	1"-2½"	1½"-30"				
Returns	180° Extra Long Radius	¾"-24"	1"-2½"	1"-12"	1"- 8"		
Tees	Straight	¾"-24"	¾"-24"	¾"-12"	1"- 8"		
Tees	Reducing Outlet	1x¾-24x20	¾"-24"		1x¾-12x10		
Reducers	Concentric & Eccentric		1x¾-24x20		1"- 8"		
Caps		1"24"	1"-24"				
Stub Ends	Lap Joint	1"24"	1"-24"				
Nipples	Shaped, 90° to Header	1¼"-12"	1¼"-12"				
Nipples	Shaped, 45° to Header	1¼"-12"	1¼"-12"				
Saddles		2"-24" ••					
Laterals	Straight	1¼"-24"	1¼"-24"				
Laterals	Reducing-on-Run	1¼"-24"	1¼"-24"				
Crosses	Straight	¾"-24"	¾"-24"				
Rings	Welding	¾"-12"	¾"-12"				
Sleeves	Welding	2"-24" ••					

	150 Lb.	300 Lb.	400 Lb.	600 Lb.	900 Lb.	1500 Lb.	2500 Lb.
Welding Neck	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"•	½"-24"	½"-24"
Slip-On	½"-24"	½"-24"	½"-24"†	¾"-24"	½"-24"•	½"-24"	½"-24"
Lap Joint	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"•	½"-24"	½"-24"
Threaded	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"•	½"-24"	½"-24"
Blind	½"-24"	½"-24"	½"-24"†	½"-24"			
Socket Type	½"-24"	½"- 4"		¼"-3½"			
Reducing-threaded or slip-on	¾"-24"	¾"-24"	¾"-24"†	¾"-24"	¾"-24"•	¾"-24"	¾"-12"
Orifice—threaded		1"-24"	4"-12"	4"-12"	3"-12"	1"-12"	
Orifice—slip-on		1"-24"					
Orifice—welding neck		1"-24"	4"-12"	1"-12"	3"-12"	1"-12"	
Long Welding Neck	1"-24"	1"-24"	1"-10"	1"-10"	1"-10"	1"-10"	

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production
By States — Page 78

CRUDE-OIL STOCKS 223,040,000 bbl. as of August 19 —down 557,000 bbl. One year ago 236,486,000 bbl.

GASOLINE STOCKS 81,850,000 bbl. as of August 19 —up 647,000 bbl. One year ago 71,742,000 bbl.

RESIDUAL FUEL-OIL STOCKS 58,737,000 bbl. as of August 19—up 1,734,000 bbl. One year ago 66,739,000 bbl.

GAS OIL AND DISTILLATE STOCKS 40,308,000 bbl. as of August 19—up 273,000 bbl. One year ago 35,782,000 bbl.

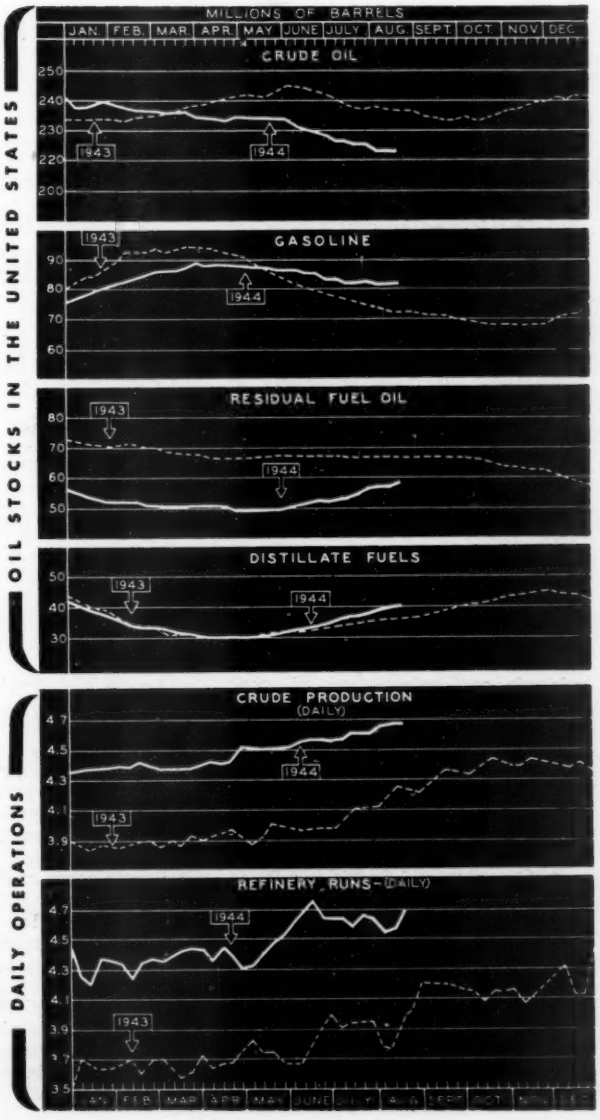
CRUDE-OIL PRODUCTION 4,673,050 bbl. as of August 26—down 5,400 bbl. One year ago 4,202,000 bbl.

REFINERY RUNS 4,694,000 bbl. daily week ended August 19—up 134,000 bbl. Year ago 4,094,000 bbl.

AS this is written it appeared certain that Romanian petroleum facilities would be completely under the control of the Russian armed forces before the end of the week. Observers have pointed out that this is a development of major importance, not only because the Germans are losing their principal crude-oil supply, but also because the Romanian fields and refineries, if rehabilitated quickly, will be substantial contributors to future Allied petroleum requirements in an important area. Romania, which had a peak crude-oil output of 180,000 bbl. daily in 1936, has been generally credited with producing approximately 100,000 bbl. daily since the fields and plants came under German control in 1940. Prewar reports listed 48 refineries in Romania, 25 of which were unimportant finishing or compounding plants. The 23 other plants varied in capacity from a few hundred to 35,000 bbl. daily.

IT has been estimated that Romania, over the past 4 years, has furnished Germany two-thirds of its crude-oil and one-fourth to one-third of its total petroleum supplies, including synthetics. The Romanian operations were particularly important to the Germans because of the lubricating oils obtained from the larger refineries located principally in the Ploesti area. Reports over the past 2 years have indicated that a shortage of lubricants was the most serious phase of the petroleum situation in the German war program.

NO information has been given out as to the present status of the Romanian refineries and other facilities which have been heavily bombed in recent weeks. It is stated that the Allies for some time have had military units trained to take over Romanian properties as soon as they were captured by the Allies. This program includes the equipment and materials required for rehabilitation. Subsidiaries of the Shell and the Standard Oil Co. of New Jersey are the principal operators in Romania, with French and Belgian interests represented in the refinery and production operations. If the Germans did not carry out a demolishing program before they deserted the petroleum properties which had been operated under their direct control, it is believed that after a few weeks an important oil output can be added to the Allied sources of supply.



Rigid Rules Established for Disposal of War Pipe Lines

by Henry D. Ralph

WASHINGTON. — Sharp restrictions on disposal of government-owned pipe lines were written into surplus war property legislation passed last week by House and Senate and sent to conference committee, with both bills containing provisions requiring congressional approval of the sale of such properties as the big and little-inch pipe lines.

As passed by the House, the Colmer bill permits leasing of pipe lines for not more than 5 years, but before a sale of a pipe line costing $5,000,000 or more can be made, a complete report must be submitted to Congress. Such a report, to be made by the administrator of the Surplus War Property Administration which this bill creates, would give complete appraisal of the property, outline the economic problems surrounding it, and present a plan for disposal. Unless Congress directed otherwise within 6 months after submission of the report, the administrator would be permitted to dispose of the property in question according to the plan submitted. The same restrictions on reporting apply to synthetic rubber and aluminum plants.

Potential Customers Limited

Pipe lines were included in the group by an amendment offered by Rep. Francis E. Walter of Pennsylvania, who told the House that the only potential customer for the two biggest pipe lines is the Standard Oil Co. (New Jersey) which, he feared, would use them in natural-gas service, throwing many Pennsylvania coal miners out of work and cutting the eastern market for Pennsylvania coal.

The Senate bill, passed August 25, requires that plans for disposal of any government property costing $1,000,000 or more be submitted to the attorney general, the report giving the proposed disposition and probable terms and conditions. Plans for disposing of all patents, processes, techniques and inventions, regardless of cost, must also be submitted to the attorney general. The attorney general is directed to rule, within 6 months, on whether the proposed disposition will either violate antitrust laws or encourage monopoly or undue concentration of industry or commerce or restrain competition substantially. The words "concentration of industry" were clarified in an amendment providing that the phrase not be construed to refer to any geographical area.

The Senate bill also requires reports to Congress on the status of large government-built plants to be made within 6 months of enactment of the surplus property law. Not only pipe lines, synthetic rubber and aluminum, but aviation plants and facilities, chemical plants and facilities, patents, processes, techniques and inventions, and other major-plant classifications are included in the list of government-owned installations subject to specific supervision by Congress.

Fear that large corporations will find windfall bargains in government-built plants and fear that sectional interests and industries will be adversely affected by their disposal dominated debate. While numerous amendments have broadened the original differences between House and Senate versions of the proposed law, the basic aims of preventing monopoly, aiding reconversion in disposal methods, aid to small business and other groups are much the same. The major difference between the two lies in the organization of the controlling agency. Under the House bill, authority to direct all surplus war property disposal would rest in a single administrator, aided by an advisory board made up of the heads of various government agencies. In the Senate version, an eight-man board would supplant the single administrator.

Both bills are based upon recommendations made by W. L. Clayton, chief of the Surplus War Emergency Administration established last spring by executive order. The House bill was introduced by Rep. William M. Colmer of Mississippi. Senators James E. Murray of Montana, Tom Stewart of Tennessee and Robert A. Taft of Ohio introduced the Senate bill, which was rewritten in the Senate military affairs committee.

Oil Companies Charged in Conspiracy With Railroads to Support Rates

WASHINGTON.—Charges that railroads have conspired with major oil companies to maintain high rail-freight rates and high pipeline rates for transportation of oil in the Mid-Continent area are included in an antitrust complaint against the Association of American Railroads and others filed by the Department of Justice in the U.S. District Court in Lincoln, Neb., August 23.

The complaint asks dissolution of the A.A.R. and the Western Association of Railway Executives, and an injunction against 47 midwestern railroads, their principal executives, two investment banking firms, and 31 other individuals. No oil companies or oil executives are named as defendants, though the charges are similar to some of those in the currently dormant indictment of the American Petroleum Institute and 22 major oil companies.

The defendants are charged with a long list of alleged conspiracies to suppress competition among railroads and maintain high freight rates in the western part of the United States in violation of the Sherman antitrust act.

Three of the 29 counts pertain to oil freight.

It is charged that the railroads, as a part of their conspiracy, entered into an agreement with those major oil companies which own and operate common carrier pipe lines under which pipe-line rates were maintained at the same level as rail rates, "thus protecting the high-long-haul rail rates which have been and are maintained by the defendant railroads" for the movement of petroleum products from refining centers in Oklahoma and Texas to consuming centers in the western part of the United States. The complaint says that the agreement requires pipe lines to maintain high minimum tenders and requires railroads to establish reduced rates on short-haul rail movements from the refineries and terminals of the major oil companies. As a part of this ageement, the complaint says, "the oil companies, notably the Standard Oil Co. (Indiana) have agreed to support and have supported the defendant railroads in applications for increases of long-haul rail rates."

The second oil count is that the railroads agreed with pipe lines to

publish proportional rates for movement by rail beyond pipe-line terminals at such figures that the combination rate to ultimate destination is the same as the through rail rate, while the pipe lines agreed to publish joint rates constructed on the same rail equalization basis as the individual rates of the pipe-line companies and also the proportional rates to the various terminals on each other's lines. It is also charged that the pipe lines and railroads have not established any joint through rail-and-pipe-line rates, thus depriving the public of the inherent benefits of low-cost transportation by pipe line.

In 1939 and 1940, the complaint charges, the railroads held a series of meetings in Chicago and St. Louis at which it was agreed that the Rock Island and Missouri Pacific should not be permitted to publish low train-load or 40-car rates for moving petroleum products from Texas and Oklahoma to the Chicago area, as was being sought by independent refiners and shippers, these low rates being opposed by the pipe lines. Subsequently these two railroads sought to establish lower one-car rates for the same movement but the other railroads and pipe lines together agreed not to permit reduction in rates.

Creole's Venezuelan Production Increased 86 Per Cent

PRODUCTION of Venezuelan crude oil by Creole Petroleum Corp. is now running 86 per cent ahead of output a year ago, C. H. Lieb, president, reported in New York last week in announcing a consolidated net income of $31,800,000 for the first 6 months of 1944, or $1.19 a share on 26,606,610 shares outstanding on June 30. This compares with $10,600,000 earned in the first half of 1943 by Creole and Lago Petroleum Corp., the Venezuelan properties of which were acquired by Creole in August of last year.

Attributing the improvement in earnings to Creole's large participation in supplying the current heavy demands in the Caribbean, Lieb said that a large portion of Creole's current net income will be reinvested in Venezuela. Substantial new refinery and auxiliary facilities will soon be installed there by Creole.

Cash reserves are being maintained in anticipation of a possible large postwar reduction in operating programs and for maintenance of properties which to some extent has been deferred because of shortage of essential materials.

Royalty payments to the Venezuelan Government for 1944 have been the highest in Creole's history. Income taxes also are now paid to the Venezuelan Government. For the first half of 1944, combined income tax and royalty payments totaled about $16,000,000.

In accordance with the program established at the request of the U. S. Petroleum Administration for War, Creole's gross production of crude now exceeds 400,000 bbl. a day. Daily average production for the first half of this year was 351,000 bbl. compared with 215,000 bbl. for the first half of 1943.

"Every effort is being made," Lieb said, "to meet these essential demands without reduction in total recovery from the fields and to attain the higher production with the greatest possible economy."

If war demand continues, Creole expects further increases in production following completion of the Jusepin-Puerto La Cruz pipe line, toward the end of the year, and the delivery next spring of three new tankers for which orders have recently been placed.

Lieb reported the resignations of Thomas W. Palmer and J. L. Cluley as directors and the election of H. F. Prioleau and J. L. Kalb as directors and vice presidents. R. L. Broughman has been elected treasurer to succeed Cluley.

Creole will move its New York office from 30 Rockefeller Plaza to the Empire State Building about September 1.

Lend-Lease Oil Value Disclosed

WASHINGTON.—A total of $1,009,399,000 worth of petroleum and petroleum products have been shipped, under lend-lease, to allied countries during the period between March 1941 and June 30, 1944, President Roosevelt reported to Congress in the sixteenth summary on lend-lease operations.

This is less than 9 per cent of the total production of this country, the report pointed out, and much of it has been used by our own overseas air and naval forces. Petroleum and its products account for about 21 per cent of all industrial materials and products furnished under lend-lease.

The total petroleum exports were broken down as follows: United Kingdom, $732,000,000; U.S.S.R., $42,000,000; Africa, Middle East, and Mediterranean area, $65,000,000; China, India, Australia and New Zealand, $162,000,000; other countries, $8,000,000.

New Drilling Rules Being Planned for Illinois

SPRINGFIELD.—Following a conference with oil and coal operators, S. F. Peterson, petroleum engineer for the Illinois oil and gas conservation division, has outlined proposed new regulations for the drilling of oil and gas wells. Peterson said approved proposals to be put into effect after about 20 days include:

Oil-drilling permits may be transferred without $10 fee payment if to a location on the same lease and not exceeding 1,320 ft. from the original location.

Operators of unused drilled wells must show cause at a public hearing why the wells should not be plugged and abandoned. Peterson estimates there are several hundred such wells in the state.

Bases beneath dry holes offsetting coal seams in mines must be substantially strengthened to prevent slipping.

Strengthening of regulations to prevent avoidable waste of gas.

Tracy Appointed Chief of Distribution Section

WASHINGTON.—Frederick B. Tracy, formerly deputy chief of the gas materials distribution section in the Office of War Utilities of War Production Board, has been appointed chief of the section, to fill the vacancy created by resignation of George H. Smith.

Tracy was associated with gas properties owned and operated by the Dawes Brothers of Chicago until 1929 when they were sold to Central Public Service Co. After that he was with North American Co. in Nebraska and Illinois.

Bill Provides for Return of Land to Former Owners

WASHINGTON.—The Senate last week adopted an amendment introduced by Sen. Elmer Thomas, Oklahoma, to surplus-property disposal legislation providing especially for the return of 532 acres of government-held oil land near Moore, Okla., to the former owners.

Open Hearings Promised on Anglo-American Oil Pact

WASHINGTON. — The British-American oil agreement signed here August 8 has been formally presented to the Senate by President Roosevelt for ratification as a treaty.

Sen. Tom Connally of Texas, chairman of the foreign relations committee, announced that his committee will hold public hearings on the agreement at which representatives of the oil industry and the general public will be invited to express their views.

Earlier in the week both the foreign relations committee and the special Senate committee on petroleum resources considered the agreement in executive session but announced no conclusions. One of the chief matters under consideration was whether the agreement actually was a treaty requiring Senate ratification or whether it was simply an executive agreement requiring no action by Congress. The State Department had left this matter open and the agreement itself stated that it would go into effect when the two governments exchanged word that they were ready, but apparently the department decided to resolve all doubts by seeking Senate approval.

The agreement was submitted to the Senate in a short formal note from the president asking that the Senate "give its advice and consent to ratification, if it approved thereof," accompanied by a letter from Secretary of State Cordell Hull summarizing the terms of the agreement.

Submission of the agreement for ratification was generally considered a wise move. Committee hearings and Senate debate should bring out all ramifications and implications. All interested parties will have an opportunity to put their views on record. Giving the agreement a formal treaty status may cause more thorough and dignified consideration by the Senate. Once the treaty is ratified there will be no doubt, here or abroad, that it represents the firm policy of the U. S. Government. Ratification will make it easier to secure the assent of other oil-producing nations to enter a world-wide agreement containing similar provisions.

No date has yet been set for hearings, and the general expectation is that little will be done until after the November elections, since Congress plans to take an extended recess this fall. As long as ratification is pending it is unlikely that the State Department will make definite moves toward setting up the international commission called for by the agreement nor toward calling an international conference to draft a world petroleum agreement as contemplated by the pact.

Ploesti Oil Prize Expected to Be Soon Converted to Allied Service

LONDON.—The Ploesti oil fields, in Romania, biggest Nazi source of desperately needed petroleum products outside German boundaries and focal point of bitter fighting in recent months, appeared early this week about to fall a prize to Allied attacking forces. Romanian troops, now active partners of the United Nations, were reported to be fighting Germans in the Ploesti region.

A statement from headquarters of Lt. Gen. Ira C. Eaker, allied air commander in the Mediterranean, disclosed that approximately 24,000 tons of explosives had been dropped on oil installations and communications in Romania. The extended assault had reduced the capacity of the Ploesti oil fields by 79 per cent, the statement declared. Production of gasoline, the most critical item, was cut 95 per cent. "Germany's prize in Romania was turned to ashes," Eaker's review of the air campaign said.

Allied aerial raids in May, June and July are estimated to have cut Germany's output of petroleum products 49 per cent.

"The enemy is finding the resulting situation extremely troublesome as is indicated by the overriding priority he has given to the repair and rebuilding of synthetic and natural oil plants seriously damaged in May, June and July," the statement said.

"A number of these installations have been repaired and put back into production. As a result of this emergency work, it is possible that some improvement in the over-all situation may take place by the end of August, but in view of our continuing attacks, it is too early to say what the situation will be then."

Russian tanks and motorized infantry on August 27 swept through Ramnicul-Sarat, Romanian oil center, only 75 miles northeast of Bucharest. The Russians were expected soon to reach the Ploesti oil fields, whose wells have been keeping Germany's battered war machine alive.

Royal Air Force heavy bombers, making their first daylight assault in the heavily defended Ruhr on the same day, bombed synthetic oil plants at Hamburg-Meerbeck. U. S. Flying Fortresses and Liberators from Italy attacked two synthetic oil refineries at Blechhammer in Silesia.

Some 750 Fortresses and Liberators of the Italian-based Fifteenth Air Force attacked Czechoslovakia oil refineries at Kolin, 40 miles east of Prague, and Parbudice, 55 miles east of Prague, on August 24.

Fortresses on August 22 struck at Odertal, in German Silesia, 80 miles southwest of Breslau, and Liberators hammered at underground oil storage tanks at Lobau, 7 miles southeast of Vienna. They used heavy, delayed action bombs. The Liberators also attacked a refinery at Korneuburg, 5 miles north of Vienna.

Hunting out Germany's hidden oil sources, 500 United States heavy bombers from Italy blasted the former Vacuum Oil Co. refinery at Czestochowa and the I. G. Farbenindustrie synthetic oil and rubber plant at Oswiecim, in Polish Silesia, 65 and 30 miles northwest of Cracow, respectively, and a refinery at Dubova, Slovakia, 115 miles north of Budapest. The three plants have a total annual production capacity of 287,500 tons.

Flying Fortresses and Liberators numbering up to 750 with escorting fighters in equal strength attacked the Scholvenbuer and Nordstern synthetic oil plant at Gelsenkirchen in the Ruhr, a refinery at Emmerich near the Netherland border, an oil refining plant at Salzbergen, near Osnabrueck, and a synthetic fuel plant at Ludwigshafen.

A dramatic example of effective bombing was reported by Eighth Air Force headquarters. It said that 2 months' work by the Germans repairing the Politz refinery was knocked out in a few minutes in a daylight attack on the works, one of the largest synthetic oil plants on the continent.

The newspaper Izvestia reported that the Germans destroyed only one of Drogobych's oil refineries (in Galicia) and set fire to only "a few" of Borislav's 800 oil wells.

THIS WEEK

PRODUCTION—National output recedes slightly from previous week's all-time record. . . . ¶First flush from pent up sales of stripper oil off the market. . . . ¶Adjusted proration schedules in larger fields expected to supply practically full quota in September. . . . ¶West Edmond mitigating District 2 shortage. . . . Field's production climbs to 22,300 bbl. daily, up 1,900 bbl. in 1 week. . . . ¶California up 5,000 bbl. to a new peak of 865,450 bbl. daily. . . .

DRILLING—Completions rise to new 1944 peak, 489 wells for the past week . . . Previous peak was 470 wells, week ended July 1. . . . ¶West Edmond, most active development area in nation, completes 7 wells, has 100-odd drilling. . . . ¶Standard of California has a drilling well less than 200 ft. shy of the state's depth record. . . . ¶Basal Permian or Devonian discovery in western Ector County, West Texas, may open drilling play. . . . ¶Another Mississippi discovery indicated. . . .

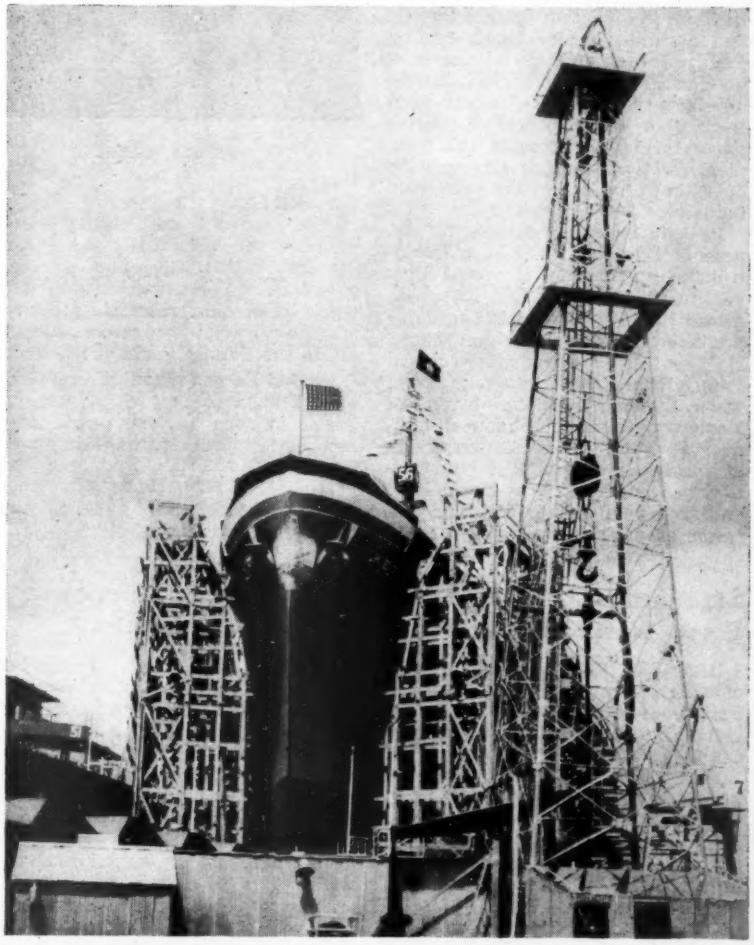
TRANSPORTATION—Oil pipe-line companies charged with conspiring with railroads to maintain freight rates. . . . ¶Congress adopts rigid rules for disposition of war pipe lines, synthetic rubber and aviation-gasoline plants. . . . House bill requires review of sale proposals by Congress, Senate leaves decision to attorney general. . . . ¶WEP lines make record deliveries to East Coast, 715,222 bbl. daily, in week ended August 5. . . . ¶Shipments of residual fuel oil from California to eastern points banned by PAW. . . .

REFINING—Refiners investigating probable basis for acquiring war plants under war-surplus-disposal administration. . . . Government's ideas of value will go far in determining peacetime operation. . . . ¶Petroleum stocks in hands of military likely to become war surplus valued at more than $2,000,000,000. . . . Much of the military storage is in remote places, requiring years for liquidation, at peacetime-consumption rates. . . . ¶Few Middle West refiners report trouble-free operation using 15 per cent sour crude. . . . ¶Standard of California's chemical subsidiary plans $1,000,000 plant. . . .

INTERNATIONAL—Public hearings promised on British-American oil pact. . . . Delay until after election probable. . . . White House request for Senate approval throws agreement wide open for discussion. . . . ¶Eighty-six per cent increase reported in Creole's Petroleum Corp.'s Venezuelan production. . . . Nation's production currently about 750,000 bbl. daily, with rise to 900,000 bbl. expected by year end. . . . ¶Standard Oil Co. of California forms subsidiary to operate all wholly owned foreign properties. . . .

NATURAL GAS—Rehearing on Memphis case set September 7. . . . At issue is Federal Power Commission's first attempt to regulate use of natural gas. . . . Long list of interveners promise full discussion of facts. . . . FPC decision will have important bearing on future operations. . . .

REGULATIONS—Spacing restrictions modified in 42 North and West Central Texas counties. . . . New Supplementary Order 14 permits development of overlying pools in a single field. . . .



The camera doesn't lie . . . or does it? Actually this montage picture was "manufactured" by a photographer to emphasize launching of the first 8,250-hp. "Hills" class of tankers at the Marinship Corp.'s Sausalito, Calif., yards. Other tankers named after prominent oil fields will follow the S.S. Kettleman Hills down the ways before the U. S. Maritime Commission program is completed

Kenneth B. Barnes Becomes Member of Journal Staff

KENNETH B. BARNES, who has been actively connected with petroleum operations in the East, Southwest and Middle West over the past 15 years as a technologist, has joined the editorial staff of The Oil and Gas Journal as associate editor. He is also a member of the editorial board of Petroleo Interamericano, Latin-American affiliate of the Journal.

Barnes recently resigned as assistant production engineer of the Gulf Oil Corp., Tulsa., after being connected with that company's operations for 9 years. His work with the Gulf organization and previous training includes rotary and cable drilling; production practices; oil and natural-gas pipe lines; cycling and refining, and petroleum economics. He has made a special study of recovery problems. He has been the author and coauthor of several papers presented at trade and technical society meetings, dealing with operating practices in the petroleum industry.

In 1930 Barnes received the degree of Bachelor of Science in petroleum engineering from the University of Oklahoma and later was awarded the professional degree of Engineer in Mining from that school. He took his post-graduate work at Pennsylvania State College from which he received the degree of Master of Science in chemical engineering. For 5 years he was assistant professor of petroleum and natural gas engineering at the college and for 1 year he was assistant professor of production engineering in

KENNETH B. BARNES

the Petroleum Engineering School of the University of Tulsa. While a member of the faculty of Pennsylvania State College he was engaged as a consultant in the college's petroleum research program and also by oil companies operating in the Pennsylvania Grade area.

In 1935 Barnes organized the Geologic Standards Co., which was engaged in core analysis, secondary-recovery work and testing. He joined the Gulf Oil Corp.'s production department in 1936. He is a member of several technical societies and trade organizations.

Standard of California Forms New Subsidiary

SAN FRANCISCO.—Organization of a new subsidiary, the Richmond Petroleum Co. of California, was announced August 29 by Standard Oil Co. of California.

Harry D. Collier, president of Standard of California, said Richmond will operate all of the parent company's wholly owned foreign properties. These are now centered in Latin America, particularly in Colombia and Venezuela.

Directors of Richmond Petroleum are: Collier, chairman; R. C. Stoner, president; Norman Hardy, vice president and general manager; Palmer Beckwith, vice president, and R. G. Follis and B. W. Letcher. H. A. McGurty is secretary and treasurer.

PAW Assigns Manpower Counselor to District 3

HOUSTON.—As part of the Petroleum Administration for War decentralization plan to place authority in district offices, a manpower counselor's office has been established in PAW District 3 headquarters at Houston, under the direction of R. V. Shirk.

Purpose of the office is to lend all possible aid to the oil industry with regard to manpower problems and also to familiarize the companies with the operating details of the manpower recruiting and selective service procedures. Assistance will be given whenever possible in securing deferment of key personnel whose absence would materially affect the industry's part in the war.

PAW as exclusive claimant agency for petroleum is authorized to make recommendation to Selective Service on 42-A Specials and to certify to requests of the industry for manpower priorities and ceilings which are placed with the appropriate committees of WMC and WPB. As an agency they are permitted membership on these committees to effect full representation.

Shirk, who has had extensive experience in various phases of the oil industry during the past 20 years, was among the first men to be called to Washington in August 1941. During the past 18 months he has dealt with problems of manpower in their relation to the petroleum industry, covering the entire United States. Inasmuch as a large part of this time was spent in District 3, Shirk is thoroughly familiar with the Texas situation.

More Than 4,000,000 Bbl. Gained by Water-Flooding

WASHINGTON. — Water-flooding has yielded more than 4,000,000 bbl. of oil in Kansas since 1936, according to a Bureau of Mines report by Peter Grandone, petroleum engineer at the U. S. Bureau of Mines experiment station in Bartlesville, Okla. The Kansas State Board of Health aided in preparation of the report, the bureau said.

"The application of secondary-recovery methods is a most valuable conservation measure in that it prevents the premature abandonment of producing properties and also is one of the most promising measures for relief of the acute shortage of crude oil," said the report.

Fifty-two water flooding projects were undertaken in Kansas on 2,612 acres. The recovery up to November 1942 was 4,200,000 bbl. of oil, the result of injection of 41,000,000 bbl. of water. The yield is continuing.

The water repressuring has been confined to stripper wells in 13 counties in the southeastern part of the state. This is in an area extending from the Missouri-Kansas boundary westward through Greenwood County and from the Oklahoma-Kansas border northward through Franklin County.

Carter Opens District Office at Vicksburg, Miss.

Carter Oil Co. has established district production offices in Vicksburg, Miss.

The new Vicksburg district is the result of the company's consolidation of district offices at Pickens, Miss., and Jena, La. It forms a part of the Carter's southern division, headquarters of which are located in Shreveport, La.

FOUNDED IN 1910

BY PATRICK C. BOYLE

The OIL AND GAS JOURNAL

A Pre-Election Handout

ALTHOUGH individual operators are not specifically named as defendants, the oil business is made a party to the suit filed last week at Lincoln, Neb., by the Department of Justice against 47 railroads, their executives, railway associations and banking firms. It is alleged "that the defendants by conspiring with the major oil companies owning and operating common-carrier pipe lines, have fixed arbitrary and noncompetitive rates for the transportation by rail and pipe line of petroleum and petroleum products and that thus the advantage of low-cost movement by pipe line was denied to the West." The principal contention of the suit is that the defendants by maintaining excessive rates on all products have conspired to favor the East over the West.

So far as the case generally is concerned it appears that the Department of Justice, having run out of charges against all types of business, has now started to harass another arm of the Government. When it complains about rates the department is really shooting at the Interstate Commerce Commission, which for more than 50 years has had the final say in the making of rail rates in interstate commerce. Furthermore, in alleging undue influence on the part of investment banking interests in determining railway policies the department is attacking the Securities and Exchange Commission. It has also been asked whether this suit is the reward for the amazing war record of the railroads which have expanded total shipments more than 50 per cent over 1941.

As to the oil business, the complaint largely hinges on the contention that the railroads have conspired with oil shippers so that rates are the same by rail or by pipe line. There is no secret as to what this situation is, nor has there ever been.

When plans were completed 15 years ago for the movement of gasoline by pipe line in interstate commerce the question arose as to how the rates should be established. Fear was expressed that rates reflecting the lower pipe-line costs between the few points touched by the systems would seriously disrupt the entire rail-rate structure of areas affected. The plan of making the pipe-line rates the same as the rail rates, was approved by ICC. How could there have been any conspiracy in a matter which was openly decided on a basis of general rate-making policy.

The public interest has been fully protected under this arrangement. The pipe-line returns became part of the revenue of the refining organizations which individually or collectively owned and operated the pipe-line companies. Consumers, as can be shown by a comparison of prices now with those prevailing before pipe lines became a factor in the transportation of refinery products, have benefited from the lower pipe-line costs.

It is not important to the oil industry what measuring stick is used in the determination of rates in the transportation of its products through its own facilities. The economies of pipe-line movement of petroleum products supplementing the vast crude-oil systems are so well established that further large-scale expansion is assured after the war provided there are no regulations to prevent.

The main point is that any questions regarding petroleum rates were submitted to the proper governmental agency before they became effective. The oil industry has no proper place in this suit, which in its entirety smells of being an early preelection handout.

North and West Central Texas Spacing Restrictions Eased

Increased Drilling Expected to Follow If Manpower and Materials Permit

WASHINGTON.—Well-spacing regulations have been modified in 42 counties in North and West Central Texas to permit simultaneous development of overlaying oil pools in these areas, the Petroleum Administration for War announced last week.

The action was taken by issuing Supplementary Order 14 to Petroleum Administrative Order 11, which regulates the use of materials. At the same time, these counties were removed from the provisions of Supplementary Order 8 to PAO-11, which will henceforth apply only to designated areas in Oklahoma and Kansas.

PAW officials explained that restrictions on the use of materials in drilling operations in the 42 Texas counties specified have been modified because in some localities there are two or more oil-producing formations at different depths.

Under SO 14, the spacing of wells is governed by the depth of the productive formation to which the wells are to be drilled. Wells may now be drilled to any one of the specified depth ranges without regard to wells drilled to oil zones at other depths.

PAW officials believe that the changes in well-spacing requirements will encourage the drilling of additional wells in this area and will result in increased production of crude petroleum in sufficient quantities to justify the expenditure of material and manpower that will be required.

Under SO 14, the following well-spacing regulations will now prevail: 5-acre spacing for wells drilled to 1,400 ft. or less; 10-acre spacing between 1,400 ft. and 2,500 ft.; 20-acre spacing between 2,500 ft. and 3,400 ft., and 40-acre spacing for wells deeper than 3,400 ft.

The order leaves to the state regulatory body the requirements as to the distance between wells and the distance of wells from property lines.

The Texas counties affected by the order are: Archer, Baylor, Brown, Callahan, Clay, Coleman, Comanche, Concho, Cooke, Coryell, Denton, Eastland, Erath, Fisher, Foard, Grayson, Hamilton, Hardeman, Haskell, Hood, Jack, Jones, Knox, Lampasas, McCulloch, Mills, Montague, Nolan, Palo Pinto, Parker, Runnels, San Saba, Shackelford, Somervell, Stephens, Stonewall, Taylor, Throckmorton, Wichita, Wilbarger, Wise, and Young.

Gulf Challenges Validity of Mississippi's Oil Tax

JACKSON. — Constitutionality of Mississippi's crude-oil severance tax law, passed at the last session of the legislature, is challenged in a suit filed here last week in Hinds County Circuit Court by Gulf Refining Co. The action, Gulf attorneys said, arises from refusal of certain royalty owners to accept their payments from the oil company with their pro rata share of the tax deducted. The owners advised the company that in deducting the tax from their royalty payments, it is doing so at its peril.

Under terms of the act, the legislature required oil companies to collect the tax and to prorate it among all participating groups. Oil companies are liable for the payment to the state.

Standard of California and Texas Form New Company

NEW YORK.—Standard Oil Co. of California and The Texas Co. have formed a new corporation, American Eastern Petroleum Co., to conduct important foreign exploratory and development operations, according to a joint statement of Harry D. Collier, president of Standard, and W. S. S. Rodgers, president of Texas.

Collier and Rodgers said their companies, already associates in various foreign projects, will own 50 per cent each of the capital stock and assets of American Eastern, which plans to develop properties in Egypt, New Zealand and Australia, as well as in the Netherlands East Indies as soon as it is freed from Japanese domination.

Arabian and Bahrein Island properties of the two companies which they control through Bahrein Petroleum Co. and California Arabian Co., are not to be included in the American Eastern setup.

Officers of the new company, which will have headquarters in San Francisco, are: E. A. Skinner, president and director; E. M. Butterworth, vice president and director; F. C. Sealey, vice president and director; J. H. MacGaregill and G. E. Olmstead, directors; H. G. Parker, secretary-treasurer, and H. J. Hawley, manager of exploration.

More Pools Qualified to Receive Subsidy Price

WASHINGTON. — Additional orders covering new pools added to the stripper well subsidy program were issued this week.

New pools added include:

Illinois: Maud, Wabash, 25 cents.

Indiana: Oatsville, Pike, 35; Bowman, Pike, 35, and West Princeton, Gibson, 35 cents.

Kansas: Atyeo, Lyon, 35 cents.

Michigan: South Adams, Arenac, 35 cents.

Oklahoma: Piggot, Osage, 25 cents; Wilson, Pawnee, 25 cents, and Wood, Creek, 25 cents.

In a separate order, payment to Hewitt field, Carter County, Oklahoma, was increased from 25 to 35 cents.

Four States Take Action on Motor-Fuel Taxation Laws

NEW YORK.—Action on motor-fuel tax laws has been taken by four states thus far in 1944, according to a report of Federation of Tax Administrators, which says that of Louisiana is the most significant.

Louisiana has exempted tractor fuel from the state's 4-cent and 2-cent-a-gallon motor fuel taxes, and from the state kerosene tax. The amendments providing for the tractor fuel exemptions, however, must be approved as a constitutional amendment at the November 7 election. Louisiana also has limited motor fuel tax exemptions granted the federal government to quantities of 6,000 gal. or more purchased for use in ships or aviation.

New York has extended its emergency and additional emergency taxes on motor fuel, each tax levied at a rate of 1 cent a gallon.

Mississippi henceforth will tax motor fuel sales to the federal government, except sales of fuels destined for use by the armed forces. South Carolina reenacted its oil tax laws without change.

PAW Bans Residual Shipments from West

WASHINGTON. — A ban on the shipment of residual fuel oil eastward from West Coast states (District 5) was announced August 25 by the Petroleum Administration for War.

This action was taken by issuing Petroleum Administrative Order 23 which becomes effective September 15, 1944.

Specifically, the new order prohibits the delivery of residual fuel oil, including railroad and industrial fuel. bunker grade fuel, or any crude oil used as residual fuel from any point within the area embraced by the states of Washington, Oregon, California, Nevada, Arizona, and 20 counties in Idaho to any other point in the continental United States.

The ban is not applicable to normal tank truck movements in effect during the 6-month period immediately preceeding issuance of the order.

(The 20 Idaho counties affected by the order are Ada, Adams, Benewah, Boise, Bonner, Boundary, Canyon, Clearwater, Elmore, Gem, Kootenai, Idaho, Latah, Lewis, Nez Perce, Owyhee, Payette, Shoshone, Valley, and Washington.)

Military Needs

PAW officials explained that the purpose of PAO 23 is to conserve fuel oil for military uses along the West Coast and in the Pacific theater and, at the same time, to bring about a more efficient use of the refining and producing facilities of Wyoming and Montana. Previously, a portion of the fuel oil consumed in the Rocky Mountain area (PAW District 4) was imported from the West Coast. The improved conditions in Montana and Wyoming make available enough fuel oil to supply local needs.

This action will not result in a decreased amount of fuel oil in the Rocky Mountain States (PAW District 4), but will release additional West Coast refining facilities to aid in the all-out effort to meet military demands for petroleum products needed in the Pacific war theaters, PAW said.

Higher Oil-Barge Rate in Louisiana Authorized

WASHINGTON. — Maximum charges for the transportation of petroleum products by barge on certain waterways in Louisiana have been increased.

The new maximum rate, effective August 26, is 15 cents per barrel, compared with a previous rate of 8¾ cents per barrel and applies only to barge transportation of petroleum and petroleum products shipped by the Standard Oil Co. of Louisiana between the producing field at Bayou des Glaises to North Baton Rouge, Louisiana.

The increase has been granted to help the Standard of Louisiana in obtaining barge transportation for its products over this route, which is a particularly hazardous waterway.

Sun Company's Output Increased 46 Per Cent

PHILADELPHIA. — Sun Oil Co. during the first 7 months of this year produced 13,433,000 bbl. of crude oil, an increase of 46 per cent over its production for the first 7 months of 1943. This compares with an increased production for the industry as a whole over these periods of approximately 15 per cent.

In achieving this increased production, explained J. Edgar Pew, vice president, Sun Oil Co. did not deplete its existing reserves. On the contrary, Sun discovered and proved oil reserves at an approximate rate of twice its withdrawals.

During the first 7 months Sun completed the drilling of 210 wells. Of this number 134 were oil producers, 10 gas wells and 66 dry holes.

The company in the last several months has had several new developments that on the basis of the discovery wells promise substantial results. Among the more important wildcat discoveries and extensions of the year have been the Cankton field in South Louisiana; a unit development with the Standard Oil Co. of Ohio near Egan; a new development on the Chacahoula dome, also in Louisiana; an extension in the Canales field in Texas; another field southeast of Canales on the Sullivan ranch; the North Winnie field, southwest of Beaumont, Tex., and the Garcia field in Starr County. Sun also has been active in the Heidelberg field in Mississippi.

Allocation of Butadiene And Styrene Abolished

WASHINGTON. — Allocation controls were removed August 25 from civilian production of styrene and butadiene, raw materials in the production of synthetic rubber.

The allocation control was lifted by revoking Order M-178 (butadiene) and by an Amendment to Schedule 18 (styrene and dichlorosytrene) of Order M-300, the general chemicals order.

Production of butadiene and styrene in government financed and operated plants has never been subject to allocation.

Memphis Gas Case Rehearing Called

WASHINGTON. — A rehearing of the controversial decision of the Federal Power Commission denying authority to the Memphis Natural Gas Co. to deliver additional gas to Memphis, Tenn., has been scheduled for September 7 in the post office building in Memphis.

The hearing originally was scheduled to be held in Washington but was transferred to Memphis at the request of the company and other interests which have intervened. The company had applied for a certificate permitting it to construct three loops of 18-in. line totaling 61 miles to increase by 21,000,000 cu. ft. per day its capacity to deliver natural gas from the Monroe field in Louisiana to Memphis for general commercial uses. The certificate was denied by the FPC June 10 on the ground that reserves in the Monroe field are declining and the gas should be reserved for uses superior to those proposed.

The decision has created wide interest as establishing a new policy under which the commission apparently is undertaking to determine the ultimate uses of competing fuels.

Judd Made Associate Director of Fuel Prices

WASHINGTON.—Orville D. Judd, price executive of the Petroleum Price Branch since April 1943, has been appointed associate director of the Fuel Price Division of the Office of Price Administration, Deputy Administrator James F. Brownlee announced last week.

Judd was in the Cleveland OPA office for a year before going to national OPA. From 1925 to 1942, he was associated with the C. I. T. Corp. of New York as vice president. He also worked for a number of years in the Texas and Oklahoma oil fields, first as a production supervisor, later as head of his own drilling and refining company.

Magnolia Posts Prices in Ellenburger Oil Pools

DALLAS. — Magnolia Petroleum Co. this week posted the following prices for crude oil purchased by it in the Kermit Ellenburger and Keystone Ellenburger (Ordovician) pools. Below 25° gravity, 93 cents, with 2 cents differential for each degree of gravity, beginning at 95 cents for 25° to 25.9°, to a top of $1.25 for crude of 40° gravity and above, based upon use of 100 per cent tank tables. The price schedule is effective as of August 1.

Mid-Continent Refiners Reappraising Postwar Position of Catalytic Cracking

by Arch L. Foster

This report on trends in operations and planning of Mid-Continent refiners is based on discussions with representative operators in a swing through the area by the Journal's refinery editor. Small refiners and some of the larger operators, interviews disclose, are in danger of letting the parade pass unnoticed. Belief is growing that catalytic-cracking plants will prove practical and profitable in the long-term postwar period.

NUMEROUS Mid-Continent refinery technologists and general executives are swinging to the conviction that wartime catalytic-cracking units can be operated profitably and fully justified by competitive conditions anticipated in the postwar period.

One of the Middle West's most widely known technical executives declared last week that the know-how obtained during war operation will make the catalytic-cracking processes more economical in peacetime, that yields of aviation fuel are upped importantly when making motor fuel, while costs are lowered considerably.

His views, of course, are wholly rejected by some Mid-Continent refiners. Others are undecided and are frankly groping for direction which will guide their operations to a sound postwar level. Still others, who earlier were complacent in their belief that thermal operations would regain their full prewar stature, have swung to the view that catalytic cracking and reforming have won a permanent position in manufacturing technique.

The previously quoted executive pointed out that Socony-Vacuum Oil Co., Inc., and Sun Oil Co. operated catalytic crackers and reformers at a profit under prewar conditions and that the companies built multiple units without the compulsion of war emergency. Since those companies found them profitable, it stands to reason that the larger number of companies will be able to operate their war-built catalytic-cracking units at a profit and to maintain and thereby increase the octane rating of their products.

Alkylation Outlook in Doubt

Little hope or expectation of continuing the operation of isomerization units as now constituted is held by most engineers and executives who discussed the subject, except possibly by those companies making 100-octane-number aviation fuels in the postwar years. The same is true of alkylation units which probably will not be economic, particularly for motor-fuel production, and thus many of them likely will pass into standby service.

Catalytic cracking is available for the smaller refiner and the operation has been proved successful by the smallest units now in use, leading technologists say. One research-licensing concern, Universal Oil Products Co., announces that operation of a 2,600-bbl.-per-day Fluid catalytic unit has proved this small capacity practicable; no data have been made public to show the results in peacetime terms but the prospects offer possibilities. Other engineer executives claim that small-capacity catalytic crackers are considered practicable for the smaller refiner when he wants to install them, including T.C.C., Fluid and Cycloversion processes. Smaller units of these processes are in operation. More conclusive information will be available soon to show results in small-capacity installations.

Another attack on the problem of relatively small increases in octane rating is two-edged; superfractionation, and treating methods to increase or conserve lead susceptibility, such as by desulfurization. Isolation of isoparaffins for war fuels has led to installation of larger capacity for superfractionation. The normal paraffins so isolated may be reformed to boost octane rating and then can be blended with the isoparaffins. Available are the older desulfurizing processes such as Perco cuprous chloride; the Girbotol process was recently adapted to liquids as well as gases. The Solutizer and the Unisol processes have been improved and are applied widely. Refiner-technologists are convinced that more can be done by these various processes to boost octane ratings and increase total yields than has been accomplished in the past, and that refiners will so employ these processes if forced by competition.

Two Mid-Continent refiners report interesting results from operations with sour crude, which is being brought into Oklahoma and Kansas by the Stanolind Pipe Line Co. to Drumright and thence via tank car to plants. Two Kansas refiners are using a total of about 2,000 bbl. per day, mixed about 15 per cent with 85 per cent sweet crude. After 2 or 3 months of this operation, no serious corrosion effects have been uncovered, they report.

While prospects appear bright for the refiner such as those in the Mid-Continent, it is too early to determine with any certainty whether competition will force early use of catalytic processes. Some reason exists to induce belief that the newer processes may be installed and operated economically. Probably more reasons are found for believing that the refiner, for a time at least, may choose whether or not to install catalytic processes; installation will not be forced on him, probably. The question uppermost in all minds is: What octane number will competition force refiners to meet during the first 2 years of postwar reconstruction?

Maze of Questions

Immediately this question is complicated by others just as difficult to answer. What will be the principles and policy of the agreement between America, Britain, and Russia as to world oil? And therefore: What will be the crude supply available for general refinery processing, postwar? What will be the amount of the demand for 100-octane-number aviation fuel, postwar?

On most of these questions the answers of different refiners do not diverge seriously. But then they come to a puzzler: Can the important war processes, catalytic cracking, alkylation, isomerization, be operated profitably when returned to a "private enterprise" economic basis.

The average refiner has changed his opinions somewhat within the last year. A year ago those refiners having no company or DPC financed

cat cracker or other special war process for making motor or aviation fuels was at a loss to know how he would survive in competition with these mountain-size war units. His outlook has changed for the better. He cannot yet foretell just what octane levels competition may force within 2 or 3 years after the fall of Germany and Japan but he can foresee what kind of motor fuel will be necessary.

The refiner who does not possess or operate a catalytic cracking, alkylation or isomerization unit in most cases does not believe, he says, that he will find the installation of those units to be necessary in the immediate postwar period. To prove this a reasonable assumption he states that in that period the huge majority of the cars in operation will be the same old prewar cars.

Furthermore, the first cars built during this postwar period, by admission of automotive leaders, will be essentially the 1942 models with only such changes as can be made without delaying the start of production. It appears reasonable to assume that while much synthetic wartime prosperity will prevail, the car makers will not plan to saddle immediately on an overanxious car-buying public new models with excessive operating costs. Refiners believe that the prewar 72-80-octane number range will be satisfactory for 2 or 3 years, postwar. And this range can be met satisfactorily by operating the same old equipment, mainly thermal cracking, with the addition of superfractionation equipment and revisions of thermal cracking which they are planning to undertake on a large scale as soon as equipment is available.

Current reports are that, even though wartime units may be shutting down, a flood of new construction and revamping of old units will be going on simultaneously. Engineering firms, consulting engineers and equipment companies state that they fully expect to have a volume of business in the immediate postwar which will rival if not equal that during the war-plant-construction period. This conclusion is based on the number of inquiries from refiners and its great magnitude may be subject to large doses of doubtfulness in the opinion of conservative engineering and refining executives. Nevertheless, all indications point to large purchases of equipment and engineering services, postwar, to bring all plants into first-class mechanical condition, and to revise processes in some degree.

As a result of their conclusions many refiners have decided that they need not worry about catalytic methods just yet. Their program is that of surveying their plants and processes, decide what should be done, what can be done to place their units in good shape, and to get ready to do the necessary work when men and materials are available. More than one refiner is already making such surveys. They have called in experts in some cases to survey, estimate and tell the executives what can and should be done.

Army Selling Surplus 5-Gal. Steel Containers

WASHINGTON. — Surplus Army 5-gal. steel cans are being sold by Treasury Procurement's Office of Surplus Property, with graduated prices for various classes of purchasers.

About 1,000,000 cans were offered, to be sold in car load lots of 4,000 units, on an "as is" basis. Most of them are in good condition, but due to outside storage some need repainting or repairing. The cans are stored at New Cumberland, Pa., Midvale, Utah, and Mira Loma, Calif.

Price scale is as follows: 0.75 each to wholesalers, jobbers, distributors; 0.80 to oil and paint firms, mail order houses, transportation companies, other industrials buying for resale through branches of affiliated outlets; and 0.90 each to all buyers of other classes of trade buying for direct resale to users.

Orders, with certified check payable to U.S. Treasurer, and shipping instructions, may be sent to General Products Division, Office of Surplus Property, U. S. Treasury.

NLRB Certifies Bargaining Agents to General

WASHINGTON. — The National Labor Relations Board this week certified union bargaining agents for eight classifications of employes of the General Petroleum Corp. of California, and ordered a runoff election within 30 days to determine union choice of two groups of pipe fitters.

Certifications were made as follows:

International Brotherhood of Electrical Workers, Local B-11, A.F.L., was certified for all electrical maintenance and electrical maintenance-construction workers in the manufacturing department.

Los Angeles County District Council of Carpenters, United Brotherhood of Carpenters and Joiners of America, A.F.L., for all maintenance carpenters in the manufacturing department.

The Employees Union of the General Petroleum Corp. of California was designated bargaining agent for the following groups: Boiler layout A and B, and boilermarker's helpers A and B in the manufacturing department; hourly production and maintenance employes in the production department, pipe-line department and marketing department; militarized guards, and all other employes excluding usual non-union workers and certain employes already represented by previously certified unions.

Rationing of Light Naphthas Favored by Refinery Men

CHICAGO. — Rationing of light naphthas, to impede their illegal use as motor fuel in the Middle West, was recommended at a meeting here last week of oil-refinery representatives with Office of Price Administration officials. The refinery men asked that OPA take early action to designate certain light grades of naphtha as coming within ration order 5-C, which would make them subject to ration regulations. The naphthas to be included would have a 10 per cent distillation point of 220° F., or less.

It also was recommended that OPA study the possibility of over-all rationing of naphtha. Another recommendation called for study by OPA of a proposal to extend rationing regulations to cover all volatile products sold by any retail outlet down to fuel oil, an exception to be material sold in 1-gal. sealed containers.

Officials of Petroleum Administration for War participated in the discussion, and E. L. Hughes, director of marketing for PAW's District 2, urged the latter proposal, which was approved by the industry marketing committee for the district.

There are indications that any action taken by OPA for the 15 Middle Western states of District 2 may be applied nationally as it was said extension of naphtha control to the whole country was under consideration.

The meeting was presided over by W. J. Carthaus of Deep Rock Oil Corp., who estimated that the recommended action would plug 80 per cent of the black market hole in naphtha at present, although it was admitted that a greater diversion to illegal uses might flow into unregulated channels later.

Quentin W. Regestein, chief of the gasoline rationing branch of OPA, said his agency has tried to avoid an over-all naphtha rationing order, because it would be impossible to enforce and would work hardship on various classes, including industrial consumers, many of whom are closely related with the war effort. At present control of industrial naphtha purchase is in the hands of PAW, through authority of War Production Board.

Industry Housing Rules Clarified

WASHINGTON. — The Petroleum Administration for War last week called attention to a clarification and revision of the procedures to be followed by petroleum operators and by certain of their employes in obtaining priorities assistance for materials to be used in the repair and construction of petroleum-industry housing.

The revised procedure is incorporated in an amendment to Direction 1 to Preference Rating Order P-98-b, which was issued August 26 by the War Production Board upon the recommendation of PAW.

PAW officials explained that the amendment permits the use of the regular Order P-98-b maintenance and repair procedure for the upkeep of houses owned by petroleum operators in all branches of the industry and occupied by their employes. A similar privilege, providing for a special material priority, is extended in the revised direction to housing owned and occupied by employes of petroleum operators if the housing is on or adjacent to an oil or gas lease.

Districts Handle Applications

For the construction of housing on or adjacent to a lease, a petroleum operator will use the regular production rating of Order P-98-b. An employe of a petroleum operator will apply for authority to construct housing by writing to the PAW District Office for the district in which the proposed housing is to be erected.

The employe's letter requesting construction permission should be marked "Ref. P-98-b" and should contain the following information:

Name and address of the applicant and of his employer, location of the proposed housing, description of the work to be done, name of land owner, reason house is necessary, other work (such as grading) that is required, the utility connections that will be required, and estimated date when the work will be begun and finished.

Those engaged in pipe-line operations must obtain approval to use materials for housing by filing PAW Form 30 with the appropriate PAW district office.

Housing construction by operators engaged in refining, or petroleum marketing will be handled jointly by the PAW and the National Housing Agency. Production housing in urban areas also will be handled jointly by PAW and NHA. For these types of housing, operators will file form WPB-2896 with the appropriate PAW district office. In addition operators should file a letter indicating the specific need for the housing, the type of work performed by the prospective tenant, and the tenant's annual income.

Oil and Natural-Gas Taxes Swell Texas Revenues

AUSTIN. — Taxes on petroleum and natural-gas production will pour an additional $10,000,000 into Texas' coffers for the fiscal year ended August 31, according to estimates provided by the office of George W. Sheppard, state comptroller.

From the 4⅙ per cent production tax on crude oil Texas received $25,297,158 in the fiscal year ended August 31, 1943, and $23,766,315 the year before. It is predicted about $34,500,000 will be paid for the year just closed, since receipts through July totaled $31,333,999 and August revenue will be based upon the highest production in history. The revenue increase is expected to be more than $9,000,000, or some 35 per cent higher than last year.

The tax of 5.2 per cent of market value of natural gas at the well yielded $2,406,660 in the fiscal year ended August 31, 1942; $2,573,000 in the next 12 months, and will yield perhaps $3,200,000 this time. Revenues through July totaled $2,926,825 with a full month to go. The expected increase will be more than one-fourth higher than last year.

A breakdown shows the increasing importance of recycling plants, which make a variety of products from natural gas, including aviation gasoline and blending agents for high-grade motor fuel. Two years ago, 25.55 per cent of the total tax was paid through these plants; now the proportion is more than 30 per cent.

Increased utilization of natural gas and casinghead gas has been under consideration by the industry and is expected to be taken up by the Texas Legislature when it meets next January.

Gilman to Fill New Post in California's Association

LOS ANGELES.—Don E. Gilman has been appointed to the newly created office of executive vice president of California Oil and Gas Association, following the recent decision of the board of directors to widen the scope of the organization. He assumed his new duties September 1. He has been chiefly active in Pacific Coast advertising, newspaper, radio and business circles.

To accept his new post Gilman resigned as vice president and western executive of Blue Network Co. Formerly he was vice president of National Broadcasting Co.

Orders M-68 and M-68-c Are Revoked by WPB

WASHINGTON.—Because they have been entirely supplanted by Petroleum Administrative Order 11 and its supplementary orders and by Petroleum Administrative Order 12, Conservation Orders M-68 and M-68-c were revoked August 26 by the War Production Board upon the recommendation of the Petroleum Administration for War.

Both PAO 11 and its supplementary orders, which regulate the use of materials in production operations, and PAO 12, applicable to the use of materials in marketing operations, are administered by PAW.

DEATHS

Luther G. Marsh, 49, of Tulsa, field engineer for Taylor Instrument Co., died August 26 in Houston while on a business trip. He received B.S. and M.S. degrees in chemistry from University of North Carolina. He was employed as a chemist by U. S. Bureau of Mines at Bartlesville, Okla., and Pittsburgh before joining Taylor Instrument Co.

Forrest J. Medis, 41, field superintendent for Ptak Petroleum Co., died August 28 in Oklahoma City.

M. E. Cline, 65, independent oil operator of Tulsa, died August 23.

H. H. McCord, 54, Rew, Pa., equipment supervisor for Forest Oil Co., died August 19. He was president of the Foster Township School Board.

A. C. Thompson, independent oil operator of El Campo, Tex., died August 22.

Charles C. Reed, 59, Clarksburg, W. Va., general superintendent of Hope Natural Gas Co., died August 20. Reed graduated from Rensselear Polytechnic Institute and was employed as a civil engineer by Snowden Brothers & Co., oil operators, and National Transit Co. in Oil City, Pa., before joining Hope and going to Clarksburg in 1910. He directed pioneer work in development of the absorption method of natural-gasoline extraction.

POWER DISTRIBUTION

Use of Smaller Units Permits Greater Flexibility

by Neil Williams

For comparable total horsepower, difference in initial cost for large and small-sized engines is relatively little (Table 1). In some types of engines the cost of the smaller sizes, although more units are involved, is slightly less than that of the larger.

PROPER distribution of available power is an essential factor in efficient operation of mechanical rotary drilling rigs. Regardless of the aggregate amount of power a rig may have, unless it can be applied where and when needed it is of little advantage and waste results. By effective utilization of power, provided by proper distribution, it is often possible that the total power capacity on a rig can be substantially reduced.

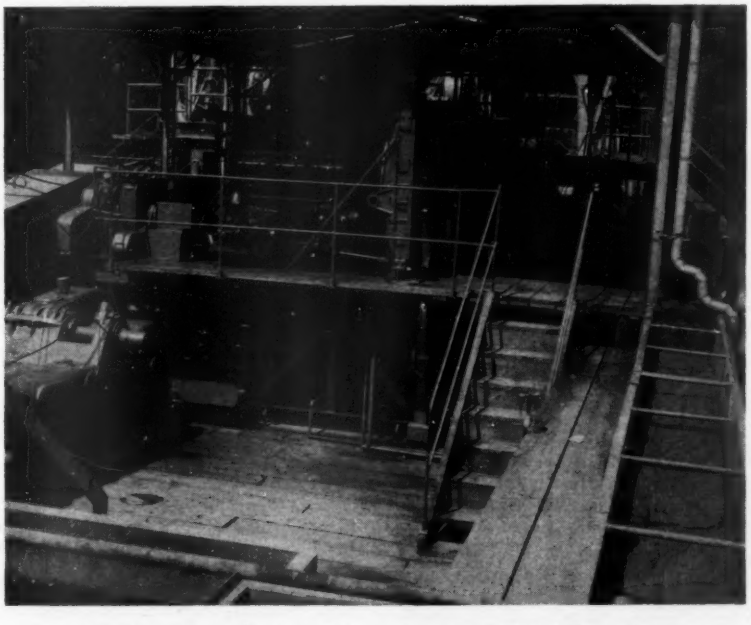
The two means of increasing rig power are (1) by use of larger engines and (2) by addition of more smaller engines. For some time there has been a tendency to follow the first procedure, and it now is common for rigs, particularly the larger, deeper-drilling assemblies, to be equipped with engines having individual ratings of 300 hp. or higher. This calls for a fewer number of units.

Lately, however, some operators and rig designers are advocating as preferable practice the second course, that of using smaller engines and meeting power demands by increasing the number of units. In this, engines of 200 to 225 hp. each, or smaller, depending on the size and service of the rig, might be provided. By compounding a sufficient number of these in the combination desired the necessary power for any phase of rig operation can be provided.

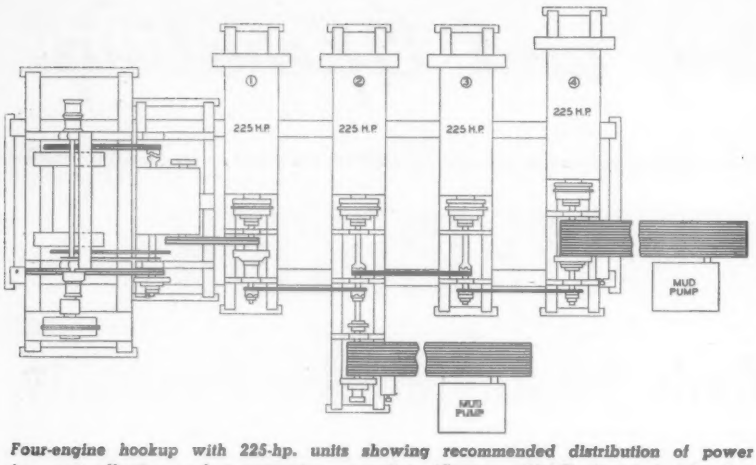
Principal power outlets on any rig are for hoisting, turning the rotary table and driving mud pumps. Normally, the greatest amount of power is required for hoisting. Since the draw works' engines are not employed for hoisting while the rotary table is turning, it has been customary on most rigs in the past to use one of them for the latter work. However, on an increasing number of rigs, a separate engine of smaller size is being provided for the rotary table, designed to relieve the draw works' engine of that service.

Mud pumps also may be driven by entirely independent engines although generally at least one, in the case of multiple-pump rigs, may be powered by an extra engine operating through a compounding transmission with the draw works' engines. In installations of the latter type, the pump engine, when all its power is not needed for mud circulation, may be used to assist the draw works engine or engines for hoisting, or vice versa, one of the draw works engines may be used to relieve or assist the mud-pump engine when not needed for hoisting.

Maximum power which can be utilized effectively and efficiently on a rig is limited by the power factors of these respective outlets. Selection of number and size of engines to provide this power is de-



Installation of four 325-hp. engines on large new deep-drilling rig operating in Mississippi. Other equipment is correspondingly large and heavy



Four-engine hookup with 225-hp. units showing recommended distribution of power for most effective and conservative operation. (Courtesy Mid-Continent Supply Co.)

pendent upon various factors, and influenced to some extent by the divergent opinions of individual operators as to their needs. Complications lie in making available adequate power capacity for all contingencies of the combined outlets without providing excessive power for the normal operation of any individual outlet.

Except in some of the deepest drilling, not more than 600 to 700 hp. usually is required for hoisting. This can be supplied either by two 300 to 350-hp. or three 200 to 250-hp. engines. Although transmission drives on some of the newer extra large rigs now have horsepower ratings of from 1,000 to 1,250, the maximum on most rigs to date has not exceeded 700 to 750. Use of engines smaller than 300 hp. on the new, extra-heavy rigs, one assembly of which employs 425-hp. engines, might be precluded. However, in a discussion of power distribution, references to engine sizes are relative as what constitute's a large engine on one rig might be a small engine for another.

Power in Emergencies

Few mud pumps, except for some of the largest, are designed to take more than 400 to 450 hp., even when operating at capacity. Much of the time in normal operation a pump is not called upon to run at capacity, and during this time less power is used; generally not more than 200 to 250 hp. is needed for normal conditions. For emergencies and peak-load conditions, however, particularly on the larger rigs, the additional power up to the capacity of the pumps usually must be made available.

When engines of relatively large size, such as 300 to 350 hp., are used, one engine often may supply much more power than actually needed for normal pump operation, incurring a waste of horsepower. At the same time, a single engine is not adequate for full pump load. Two engines of this size provide a combined power greatly in excess of what can be used by a pump, unless part of the power can be diverted to other use.

In three-engine hookups on the larger rigs, two engines generally are assigned primarily for the draw works and hoisting, leaving only the third which can be used exclusively for pumping. While one of the draw-works engines usually is tied up on the rotary table when not engaged in hoisting, the other generally can be used to assist the regular mud pump if needed. Most rigs of this size include a second mud pump, either for additional regular duty, or for auxiliary or standby use. In a three-engine hookup this pump usually is driven by a power take-off from the extended shaft of the middle, or second draw-works engine. By compounding, the power of any two or all three engines usually can be combined to drive any one or all the outlets.

The effective distribution and utilization of power afforded by dividing the total rig horsepower among a greater number of smaller engines is indicated in the accompanying drawing of a rig layout with a four-engine hookup. This hookup calls for 225-hp. units having a total of 900 hp., the equivalent of three 300-hp. engines. The recommended distribution of power for normal drilling operations provides for the use of No. 1 engine for the rotary table; Nos. 2 and 3 engines for the side pump when used as the main pump, and No. 4 engine for the back pump as the auxiliary pump. When the back pump is used as the main pump Nos. 3 and 4 engines will be used for it and No. 2 engine for the side pump as the auxiliary. For trips, Nos. 1, 2 and 3 engines are put on the draw works, leaving No. 4 engine for the mud, using only the back pump. All four engines can be compounded but their combined power is not needed and should not be used at the same time for either the draw works or the pumps.

Greater Flexibility

Use of the smaller engines permits a high degree of flexibility in power distribution. The particular advantage lies in the fact that no more power than actually needed for a certain outlet has to be used. With 225-hp. engines, power ratings are more closely adapted and balanced with requirements and limitations of the various outlets. For example, when pumping requirements are not heavy, one engine usually is adequate without an excess of unusable power. At the same time two engines can be used to supply needed additional power without overpowering pump. Also, one engine is large enough for the rotary whereas a 300 to 350-hp. engine provides an excess of power. With this arrangement, there is not a surplus of power on one unit and lack of power on another. No one engine is larger than minimum requirements of any operation demand.

Another important advantage in the use of the smaller engines is that they are easier to handle and move than the larger units. Also, repairs can be made more readily on them.

TABLE 1—COMPARISON OF ENGINE COSTS WITH HORSEPOWER RATINGS*

(Gas-Gasoline-Butane V-cylinder Engines)

No. of units	Size of unit (hp.)	Total size (hp.)	Cost per engine	Total cost	Cost per hp.
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by F. V. Cook *

The cost of power increase by the methods described in this article has been approximately $50 per horsepower as compared with a cost of around $175 per horsepower for purchase, installation and housing of additional equipment.

ONE of the most interesting applications of the Buchi turbocharger for increasing the horsepower of 15 to 20-year-old diesel engines is to be found, in the author's opinion, at the pumping stations of Stanolind Pipe Line Co. in the Missouri and Illinois divisions of its oil trunk pipe line serving the Whiting, Ind.; Wood River, Ill., and Kansas City, Mo., refining districts. The application has been especially useful in helping meet the need for additional horsepower, resulting from peak-load operations brought about by the war.

These pumping stations have six pumping units, with a total pumping capacity varying from 140,000 to 180,000 bbl. daily. Before supercharging, the capacity of the individual units varied from 14,000 to 55,000 bbl., and the horsepower of the diesel engines ranged from 250 to 1,000 each. The total horsepower of the diesel engines in a station ranged from 2,200 to 3,300. Most of the horsepower is represented by the 400 and 500-hp. engines. The small 250-hp. engines were installed when the first line was built in 1918. The 1,000-hp. engines were installed in 1936. The 400 and 500-hp. engines were purchased during 1921 and 1922. For pumping the oil through the pipe line either duplex or triplex horizontal reciprocating pumps are direct connected to and driven by diesel engines using crude oil for fuel. The customary pumping pressure is 700 lb.

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It was believed by our management that the turbocharger might prove to be a solution to this problem. With this thought in mind, we ventured on our first installation by placing an order in February 1936, through American Locomotive Co. for a Buchi turbocharger to be made by Brown-Boveri Co., Switzerland. When ordered, this turbocharger was intended for use on a 400-hp. McIntosh-Seymour, 200-r.p.m. air injection engine at our Tribbey station in Oklahoma.

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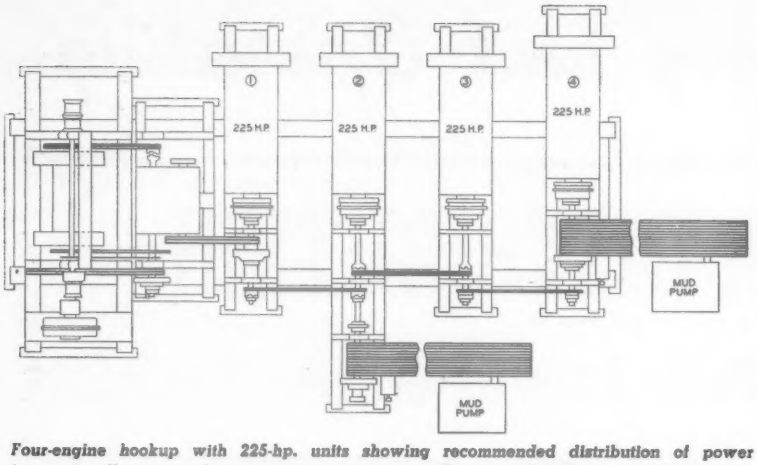

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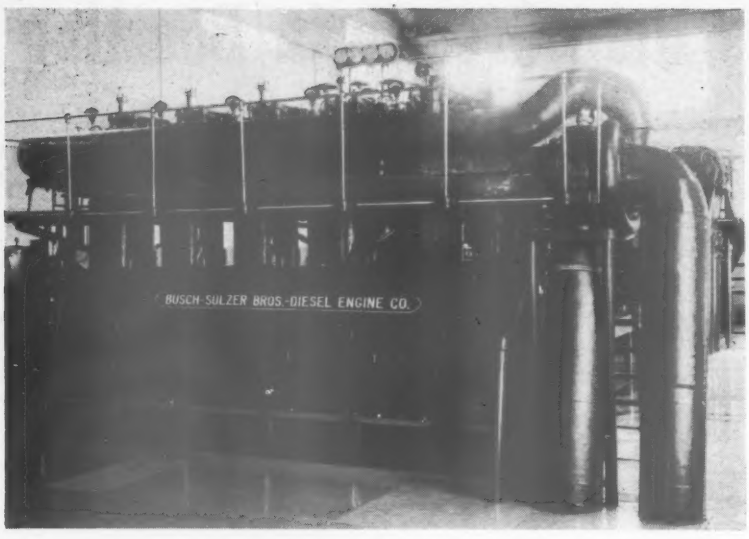


Engines at Ormonde, Ill., pumping station are supercharged by two turbochargers

delivery of the equipment was delayed and it became necessary to install another engine at Tribbey. The supercharger intended for Tribbey station was diverted to Odessa station, Missouri, and installed in October 1936. This was a fortunate circumstance because the engine on which it was installed at Odessa was a spare at that time and the troubles experienced with this first supercharger could be tolerated. This would not have been true at Tribbey, where the pumping schedule would not have allowed for the high percentage of shutdown time resulting from failures in this first supercharger.

The turbocharger furnished was known as a VTx201, which means that the diameter of the turbine wheel was 201 mm., or slightly under 8 in., and it operated at a maximum speed of 20,000 r.p.m. This machine was installed on a 16½-in. by 24-in., four-cylinder, four-cycle engine operating at 200 r.p.m. and rated 400 hp. at this speed.

Our experience with this first turbocharger was unsatisfactory and discouraging in many respects. It was too small for this 16½-in. by 24-in. slow-speed engine. Its speed was too high. Constant trouble was also experienced with the bearings. Using radial ball bearings as originally supplied, the longest run obtained on the turbocharger was 4 hours. With American-made ball thrust bearings, runs of 2,500 hours were obtained. Because of the risk of bearing failures, almost constant attendance was required to avoid expensive failures. The inexpensive replacement of bearings could be tolerated but the expense and trouble of repairing the whole turbocharger led to its junking after it was damaged a third time due to bearing failures.

While this first experiment cost a substantial amount of money, borne by Stanolind Pipe Line Co. and American Locomotive Co., who were collaborating in this application of the turbocharger, we know now that our patience and expense on this first installment was justified and feel that the company has benefited both financially and in convenience by the subsequent very satisfactory application of the turbocharger, dating from 1940 when it became impossible to purchase new diesel engines.

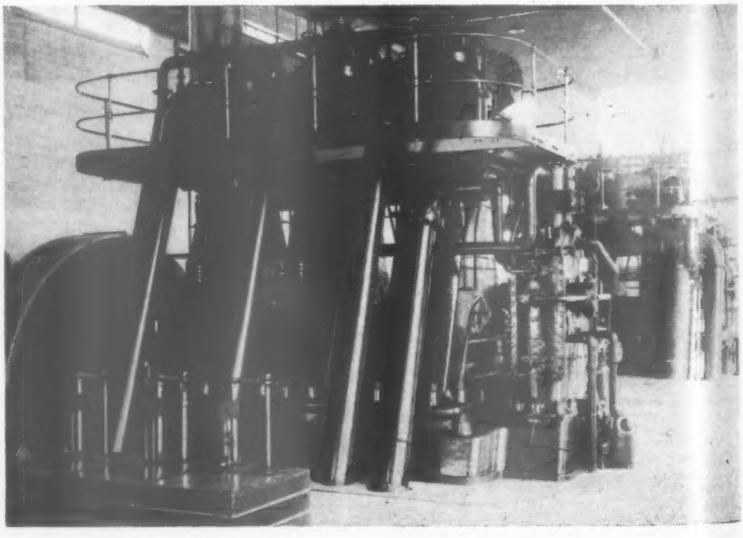
Although this first turbocharger was far from satisfactory, it demonstrated that, as claimed by the inventor, the horsepower of the types of engines in which we were interested could be increased by 40 and possibly 50 per cent. Personal knowledge that the system was practicable and that the mechanics could be worked out prevented a complete abandonment of the application of the turbocharger for our service.

Second Trial Determined Upon

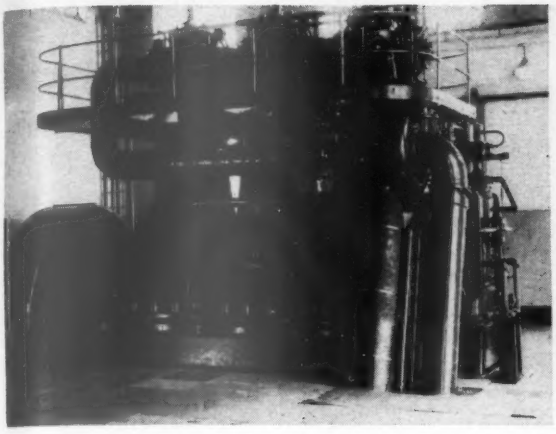
Even though tests had proved the system practicable, most of our organization was discouraged because we believed the turbochargers themselves, as manufactured by Brown-Boveri, were not reliable enough for continuous pipe-line operation. However, we agreed that our aim was sound and worth striving to attain. We were confident, also, that we knew from this first experience what would be required for a reliable turbocharger should we continue our efforts. William G. Heltzel, general superintendent, obtained authorization for a second trial installation at a substantial cost. For this second installation we were agreed on three things: (1) the turbocharger should be larger; (2) its speed should be substantially lower; and (3) sleeve instead of ball bearings should used.

After considerable discussion with the inventor and his agent, a design was agreed upon and an order for the machine placed with Brown-Boveri through Busch-Sulzer Bros. Diesel Engine Co. in July 1939. A similar turbocharger was ordered from American Locomotive Co. in June 1940.

The Brown-Boveri turbocharger was known as a VTx350 and contained a turbine wheel 350 mm. in diameter. The American Locomotive turbocharger was known as a BF-40, which indicates a turbine wheel 40 cm. or 400 mm. in diameter. Both were two-inlet machines equipped with sleeve bearings and operated



Engine at La Rose, Ill., pumping station before being fitted with a turbocharger



Left: Engine at La Rose station after being equipped with turbocharger, showing modifications. Right: An earlier model turbocharger at Carrollton, Mo., station

at a maximum speed of 12,000 r.p.m.

The first of these turbochargers was received and installed on a five-cylinder, 16¼-in. by 23-in. Busch-Sulzer engine in August 1940. The second was installed on a five-cylinder, 16½-in. by 24-in. Alco engine in December of the same year. Both turbochargers proved satisfactory mechanically, but the two-inlet design recommended by the Buchi interests resulted in interrupted scavenging of the two cylinders that overlapped in valve opening due to firing sequence. This, in turn, caused many failures of pistons and cylinder heads. Therefore, while these two turbocharges proved the soundness of our recommended changes in design with respect to size, speed, and bearings, the improper scavenging created a problem which only could be solved by the use of turbochargers with more inlets to obtain the required interval between exhaust impulses in each pipe. To overcome this difficulty we not only recommended but strongly urged three or five-inlet turbochargers for five-cylinder engines.

Aside from this new problem these two turbochargers proved practicable. We know positively that the capacity of these types of engines could be increased from 40 to 50 per cent and that the turbocharger was a practicable adjunct to them. However, we waited for sufficient experience on these two turbochargers before expanding the use of the turbocharger for other installations.

World events by this time were becoming ominous and many of us believed that our entrance into the war could not be long delayed. Anticipating, then, the possibility of not being able to buy and install new diesel engines, we watched carefully the results of the two turbochargers in service. In the meantime Elliott Co. was licensed to manufacture the Buchi turbocharger and entered this field in the United States. This was important because it was obvious we could not go ahead with our program until we had assurance that the machines and repair parts could be made and serviced by an American manufacturer, especially during the war.

As a consequence, while waiting for results from the two turbochargers in service, we negotiated and cooperated with Elliott Co. and the Buchi interests in the development of a turbocharger that would be satisfactory for use on five-cylinder engines (and worked out a program for increasing the capacity of nine pumping stations in the Missouri and Illinois divisions).

The scavenging problem might have been enough of an obstacle to have stopped our whole program, but knowing that such obstacles are a part of any new development, we continued our efforts with confidence that ultimately our goal would be attained. The circumstances that might result from war provided additional impetus, as may well be imagined.

Performance Satisfactory

By the end of 1941 the two trial installations of the turbochargers had been in service for 16 and 13 months, respectively. Except for the interrupted scavenging, the performance was satisfactory. Based on this experience and the new designs worked out, our company ordered additional turbines. By now the country was at war and as part of the repercussions of Pearl Harbor we began to feel a greater demand for crude oil at the refineries.

What we anticipated had occurred. Our need for additional horsepower at the pumping stations became an immediate reality. Fortunately much of the development and experimental work had been done. To meet the increasing war load that came on soon after Pearl Harbor, especially as a result of the German submarine warfare on the Atlantic and Gulf coasts, we ordered 12 turbochargers, for five different makes, sizes, and types of engines, as follows:

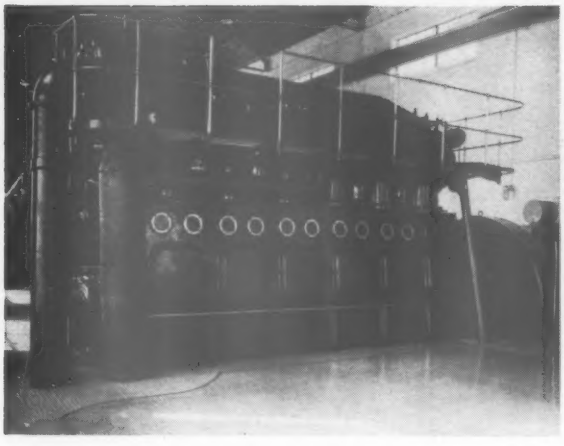
	Hp.		Cyl.	R.p.m.
1	750	De LaVergne	6	240
1	450	McIntosh-Seymour	4	225
2	520	Fulton	3	200
4	500	McIntosh-Seymour	5	200
4	500	Busch-Sulzer	5	225

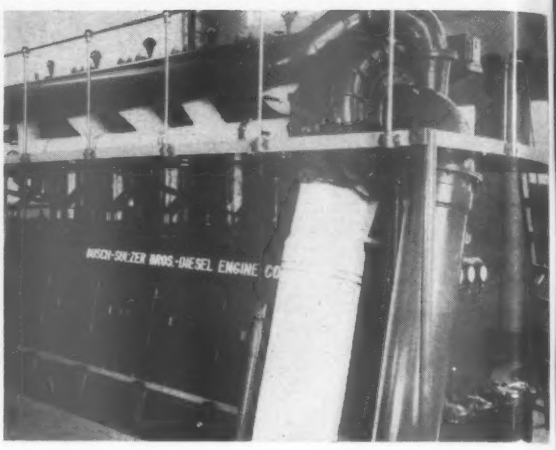
Eleven of these turbochargers were installed between May 1 and November 20, 1942. The other was not installed on the 750-hp. De LaVergne engine until October 1943. All of these engines, except a 500-hp. Busch-Sulzer and the 750-hp. De LaVergne, are air-injection engines.

These turbochargers, representing some newly designed features, have in general proved reliable and satisfactory for all these types and makes of engines. The three-inlet turbocharger has corrected the scavenging problem on the five-cylinder engine and, by a change in design, in a large measure the noise has been corrected.

After it was learned, by installing the three-inlet turbochargers, that the three-inlet feature corrected the scavenging problem on the five-cylinder engine, one of the two-inlet turbochargers, which had been purchased previously and installed on a five-cylinder engine, was replaced by a three-inlet turbocharger. The two-inlet turbocharger was transferred to a four-cylinder engine where its performance is satisfactory.

The reader may be interested in knowing what changes are required in the accessories of the engine to adapt it to the use of the turbocharger. These consist simply of replacing all air intake and exhaust piping, changing exhaust and intake cams to those designed for supercharging, and in some instances changing fuel pump and spray valve





Left: The latest type of supercharger is applied to this engine at Ormonde, Ill. Right: A close-up view of the turbocharger at Ormonde shows installation detail. All photographs courtesy Elliott Co.

parts for delivering the increased quantities of fuel. The exhaust and intake cams are different only in that they hold both valves open for a longer period at the top of the scavenging stroke so the higher air pressure can completely scavenge the cylinder of exhaust gases. Installation can be made, complete, in 6 days.

A valuable application of supercharging is found in two of our company's installations. Two 500-hp., 225-r.p.m. Busch-Sulzer air-injection engines have been increased from 500 to 980 hp. by: (1) Increasing speed; (2) converting from air injection to mechanical injection; and (3) supercharging. A gain of about 120 hp. was obtained by increasing the speed of the engine by 52 revolutions. Another 40 hp. was gained by converting from air to mechanical injection. These changes increased the capacity of the engine to 660 hp. By supercharging this 660-hp. engine its capacity was increased to 980 hp. These are pilot cases that will be followed by others in a modernization program to be carried out after the war.

The additional horsepower developed by the engines was utilized by installing larger plungers and/or increasing the speed of the pumps by installing new gears having a lower gear ratio. As these gears had been in service over 20 years and were badly worn it would have been necessary to replace them soon anyway in the process of normal maintenance.

The installation of these turbochargers resulted in an increase of 4,000 bbl. per day between La Plata and Whiting and an increase of 8,000 bbl. per day between Freeman and La Plata without additional pipe lines as they furnished the additional power required to obtain this increase by raising the line pressure.

Twenty more turbochargers are now on order for installation during 1944 to augment the capacity of the system between Freeman and Whiting by again raising the line pressure by an additional 8,300 bbl. per day.

Large Increase Required

While these increases do not seem large when compared with the total quantities of oil pumped, a large increase in power is required because the power requirements for pumping through pipe lines increase as the square of the velocity increases. Completion of this program will have increased the line pressure from 550 to 750 lb., resulting in an increase in throughput of 18 per cent and an increase in power requirements of 62 per cent. Approximately one-third of this increase will have been obtained by increasing the load factor of all equipment and two-thirds by supercharging, conversion to mechanical injection, and increasing engine speeds.

The cost of power increase by the methods used has been approximately $50 per horsepower as compared with a cost of approximately $175 per horsepower for the purchase, installation, and housing of additional pumping equipment.

Generally speaking, the performance of the most recent group of turbochargers has been satisfactory. This is evidenced by the company's extending its program through the purchase of 20 more units for installation in 1944. Further improvements are now ready and it is expected that the new machines will be even more reliable than the early ones, which have accomplished their purpose of providing a quick and economical source of additional power.

Undoubtedly problems are to be encountered in any new development of this character. However, open mindedness and close cooperation on the part of the inventor, the manufacturer, and the user are prerequisites which usually lead to the successful solution of the problems.

Dr. Hardee Chambliss, retired professor of chemistry and some time dean of the School of Engineering, Catholic University of America, has joined the staff of Geophysical Instrument Co., Arlington, Va., as consulting chemist. In the Graduate School of U. S. Department of Agriculture, Doctor Chambliss will give a general introductory course in geochemistry.

Howard C. Johnson is in charge of the office which Rock Island Refining Co. has opened in Mount Vernon, Ill. **B. F. McGraw** is superintendent.

F. E. Babcock, landman, is in charge of an office which Union Oil Co. of California has opened in Jackson, Miss.

Allan C. Harrop, refinery superintendent for Imperial Oil, Ltd., at Calgary since 1940, has been made superintendent of the Sarnia refinery. He succeeds **J. Dean Bradley,** who recently was promoted to general superintendent. Harrop entered Imperial service at the Calgary refinery in 1925, following his graduation in chemical engineering from University of Toronto.

D. R. Ryan will be in charge of an office which the crude-oil purchasing department of Standard Oil Co. (Indiana) is opening in Casper, Wyo. Since 1930 Ryan has had assignments with that company in Oklahoma, Kansas, Illinois and Texas. **P. M. Broach,** assistant chief scout at Tulsa, is to represent Stanolind Oil Purchasing Co. at Tyler, Tex., temporarily.

Permian Basin Operators May Expand Secondary Recovery

*by Frank B. Taylor**

OPERATORS in the entire West Texas-New Mexico area are giving increased thought to the possibility of applying secondary recovery to many of the more extensively produced areas. Consideration takes into account not only the relatively few strata of sand production, but are chiefly concerned with the possibilities of secondary recovery from the many semidepleted lime zones in the Permian. To date, there is but a limited backlog of referable material concerning lime repressuring, and almost none as to lime flooding. However, some operations are already under way with varying results and additional projects are proposed.

The first secondary development in the area was started in 1939 as a definite program although there were earlier experimental efforts of a restricted nature. This 1939 operation was a transplantation of gas repressuring method proven successful under similar conditions in other producing regions. The stratum involved was Yates sand in the Kermit area at a depth of approximately 2,850 ft.

Since then two operations were begun in 1940, one in 1941, four in 1942 and another in 1943. These nine operations are considered to be only the forerunners of a vastly expanded program that will materialize in the future. Much of tomorrow's work will be based upon the facts brought to light with the present research and reservoir reaction, particularly as secondary-recovery measures are applied to production of residual oils from the extensive lime formations. Of the projects now active, seven are in sand formations, while four are in lime; the apparent discrepancy between this total and the previously noted number of operations being due to the fact that one project is compounded with three formations being energized.

These projects are detailed in the accompanying table.

These pilot projects are being closely judged as affording basic information upon future applications, particularly to a lime program. In general, the results have been good, but equally important, certain information has evolved that can be applied to future developments in the lime sectors.

Using Sour Gas

One operation is using sour gas, tremendous volumes of which are available in the basin. This particular operation encountered an unforecast problem. The sour gas, in attacking the equipment on the operation, produced excessive amounts of iron sulfide in minute particles. This material was carried by the gas stream into the input wells and it was deposited in the lime stratum being repressured. Stoppage of the pore space in the exposed lime made it necessary to progressively increase input pressures to an extreme. To overcome this difficulty, the operator is currently completing the installation of desulfurization equipment in order to eliminate the sulfide from the gas. The low cost of the purification makes this plan economically practical.

An experimental operation in Permian lime in the Texas Panhandle area ran into initial difficulty when pressures were held at a predetermined level, assumed correct for the reservoir. A continuation of injection at the pressure indicated progressively serious channeling which decreased in degree with the lowering of input pressure. This operation was based largely upon data resulting from past experience in repressuring sand formations at the same general depths.

While basic data are relatively scarce on lime repressuring, and the matter has largely been one of conjecture for the past few years, the general characteristics of lime as departing from sand strata in relation to the response to secondary-recovery effort would tend to support the conclusion that a channel might be produced more rapidly and at lower pressurees in lime than in sand. From studies made of the action of lime reservoirs, it appears that production is first opened by venting interconnected crevices into the well bore. The cross-section of such openings varies, but the restrictions interconnecting the lines of flow offer, in the whole, less total barrier to flow than does a sand reservoir of the same general productivity characteristics. Conversely, a portion of the oil in lime reservoirs is only available to the well bore through a natural fixed orifice in the formation, and the rate of flow of oil so confined would remain fairly uniform through the case history of the well and in proportion to the crude so trapped. While this is true to a degree in a consolidated sand formation, it is less true because of the granular nature of the formation and the divergent lines of flow possible for the crude to assume.

This would lead to the conclusion that lime production in a flush well might be expected to drop off relatively fast, but that once a level of production was established as a normal capacity, such rate would be maintained in a natural lime formation for a period exceeding the flattened-curve rate of decline typical of a sand well. This prolonged period in the lime well would be directly attributable to the slow exhaustion of reservoirs within the pay, open to the escape crevices only through one or a number of fixed orifices.

This conclusion is supported in a study of thousands of samples and case histories of lime producing wells in West Texas made by A. C. Bulnes, Shell Oil Co., Inc., Midland and R. V. Fitting, Jr., and reported at the Houston A.I.M.E. meeting early this year. They found that in general lime offers a higher permeability, on the basis of porosity, than does sand. This is attributed to

(Continued on page 49)

*Engineering Sales & Commerce Co.

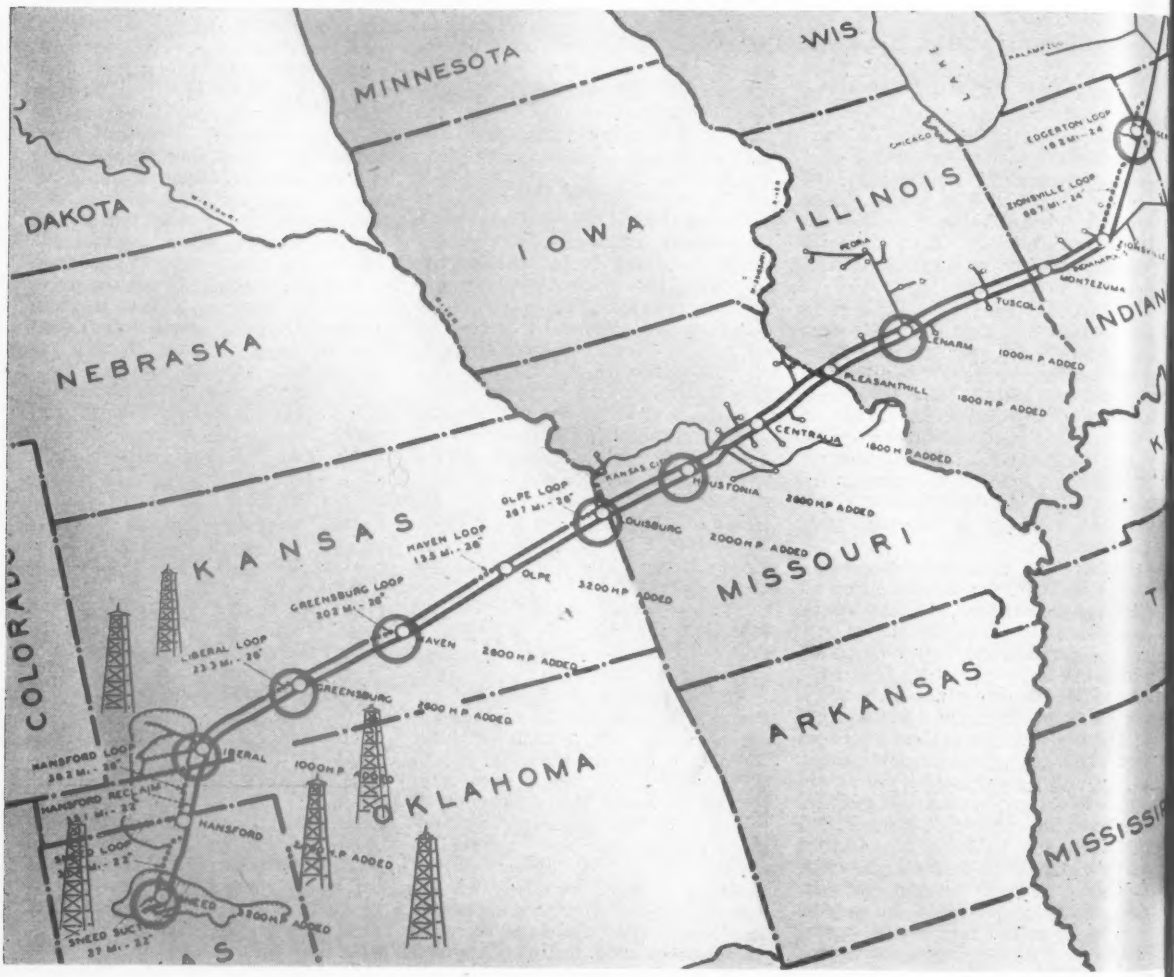
SECONDARY-RECOVERY OPERATIONS—WEST TEXAS

Location, County, Operator—	Approx. acres	Type	Avg. pay thickness	Name	Wells — Input	Wells — Prod.	Depth	Started
Kermit, Winkler, Magnolia	1,120	Gas	225	Yates sand	11	95	2,850	1939
N. Ward, Ward, Gulf	1,560	Gas	60	Delaware sand	8	148	2,750	1940
Payton, Pecos, Luce & Ice	320	Gas	30	Yates sand	3	16	2,100	1940
Estes, Ward, Humble	560	Water	50	Yates sand	2	19	2,800	1942
S. Cowden, Ector, Stanolind	360	Gas	130	Grayburg lime	1	8	4,170	1942
Kermit, Winkler, Rosley	320	Water	30	Yates sand	2	11	2,850	1943
NEW MEXICO								
Langley, Lea, Anderson-Prichard	520	Gas	13	Seven Rivers sand	2	11	3,450	1941
Maljamar, Lea, Cooperative	9,000	Gas	70	Grayb'g sndy. lm.	13	131	4,050	1942
				San Andres lime	..	...	3,200	....
				Yates sand	..	...	2,300	....
Loco Mills, Eddy, Cooperative	8,000	Gas	20	Grayb'g sndy. lm.	12	178	2,600	1942

Square Lake (proposed, but not yet an operation.)

Seven Times in

Panhandle Eastern Installs COOPER-BESSEMER Compressors



(Red symbol) Stations in which Cooper-Bessemers are installed.

Compressors *by*

New York Washington Bradford, Pa. Parkersburg, W. Va. San Francisco, Cal. Seattle, Wash.

Fourteen Years

SEVEN times Panhandle Eastern Pipe Line Company has picked Cooper-Bessemer compressors for their gas line from the Texas Panhandle across eight states to Detroit, Michigan.

The original Cooper-Bessemers were installed in 1930 and are still giving continuous, efficient service at the Liberal and Louisburg, Kan., and Glenarm, Illinois stations.

Because of their steady, trouble-free performance, Cooper-Bessmers were also installed in 1936 at Greensburg and Haven, Kan., Sneed, Tex., and Houstonia, Mo. for an expansion of the line. That same year additional Cooper-Bessemers were installed in the three original stations.

Last year, to meet the heavy fuel needs of war industries Panhandle Eastern decided to loop its line at eight different sections and to expand compressor facilities. The company had had experience with three different makes of compressors, and after careful review of operating records again gave Cooper - Bessemer the "lion's share" — 11,800 hp in six of the eleven stations being enlarged. In all, Cooper-Bessemer compressors now furnish more than 70,000 hp — well over 50% of the total compressor horsepower for the line.

Houstonia, Mo., station showing foundations for two new 1300 h.p. Cooper-Bessemer compressors.

Aerial view of Louisburg, Kansas, station where two 1,000 h.p. Cooper-Bessemer compressors were installed.

The dependable, economical performance of these compressors which led Panhandle Eastern to reorder again and again, is typical of the operating records made by Cooper-Bessemers in all branches of the oil and gas industry.

Cooper-Bessemer

MOUNT VERNON, OHIO and GROVE CITY, PENNA.

Houston, Dallas, Gregston, Pampa and Odessa, Texas — Tulsa — Shreveport — St. Louis — Los Angeles

Fischer-Tropsch Synthesis May Prove A Major Refining Process

PART 2—METHODS OF OPERATION

by Arch L. Foster

From 60 to 75 per cent of the theoretical yield of hydrocarbons has been produced from mixtures of carbon monoxide and hydrogen, formed either from coke and steam or light hydrocarbons (methane, etc.), and steam, according to technical reports in the literature. Catalysts include mainly metals of Group VIII (periodic table), iron, cobalt, nickel, ruthenium, etc., mixed with other metals or their oxides of Series 4, Groups I, VI and VII, as promoters or activators. The nature of the products made varies widely depending on the temperatures and pressures used and by so varying the conditions, with different catalysts, the Fischer-Tropsch synthesis reactions produce greatly different materials, varying from predominantly methane to lubricating oils and high-melting-point paraffin waxes. Methods for producing high-octane-number gasolines have been developed more recently.

WIDE differences of opinion exist among scientists as to the optimum conditions of operation of the Fischer-Tropsch synthesis for synthesizing various types of products. However, general agreement is reached regarding the effect of major operating conditions, and the range of conditions for production of light or heavy materials.

Reporting the results of more than a decade of work on the advancement of the technology of the synthesis, Fischer and his collaborators have investigated several important methods for improving results of the synthesis and especially means for controlling conditions and therefore properties of products. They report (2-84) that the ratio of 33.3 per cent CO and 66.7 per cent H_2 as being the optimum, this mixture showing the highest reaction rates and highest yields. Fischer describes an operation wherein gas mixtures (1) of 50 per cent coke-oven gas and 50 per cent water-gas, and (2) 50 per cent of a gas made by cracking methane from coke-oven gas, and 50 per cent of water-gas, is desulfurized over iron filings at 400° F. The desulfurized mixture is passed over a nickel-manganese-aluminum-on-kieselguhr catalyst at 190° C. (374° F.) at the beginning of a run, and the temperature is raised to 210° C. (410° F.) near the end of the run. Paraffin waxes form on the catalyst gradually, and can be removed by benzene or any satisfactory solvent. To regenerate, the catalyst heated at 450° C. (842° F.) in a current of hydrogen for some 4 hours.

Fischer points out one of the controlling factors in the operation of the process when he says in effect that good control of temperature rise is "a great advantage." This advantage is obtained in large measure by using a liquid-oil-suspended catalyst, which liquid aids in carrying away the heat of reaction efficiently and at a uniform rate. Many other experimenters emphasize the need for temperature control as vital in operating the synthesis and this appears to be one of the three or four absolutely vital factors which must be solved in any successful commercial process. Dispersion of the gas in the liquid suspension of catalyst must be very fine, it is stated, in order to maintain the required speed of reaction. This fineness of dispersion of the gaseous charge increases the expense of pumping and handling, over that encountered in driving the charge through a solid-supported catalyst bed.

Sulfur Removal Desirable

With a dry catalyst in revolving drums or cases the results were satisfactory in small experimental installations but in larger commercial-type drums the effect was bad, since localized overheating or underheating was difficult to control; much of the catalyst was lost in the form of dust. Trial of reaction chambers such as pipes through which the charge gases passed in which the catalyst was bedded and around which oil was flowing to cool and control the temperature of the chamber showed much better results. Laboratory experiments showed that the catalyst chamber can be as long as 5 m. (16.4 ft.), at least 10 cm. (4 in.) wide, a depth of catalyst bed of not more than 15 mm. (0.6 in.), with a gas flow of not more than about 7 cu. m. (247+ cu. ft.) per hour through this cross section. A large-scale experimental or pilot unit built on these dimensions was operated at 6.8 cu. m. per hour gas flow rate with 21.3 kg. (47— lb.) of the Ni-Mn-Al-kieselguhr catalyst. The unit operated automatically for 200 hours, and after 1,000 hours it was necessary to regenerate the catalyst.

All charge gases for this synthesis must be cleared of both hydrogen sulfide and organic sulfur compounds for optimum results, Fischer reports on another occasion. Sulfur must be reduced to a value less than 0.1 g. of S per 100 cu. m. (3,500+ cu. ft.), with the result that the product is almost entirely free of sulfur and has high lead susceptibility, along with greater catalyst life and activity (2-85). Nickel is not suitable to synthesize liquid hydrocarbons, Fischer says. High in hydrogenation potency, Ni forms mostly methane, he states. The nickel at high pressures forms nickel carbonyl with the CO present and gradually is so volatilized. At 50 atm. (750 lb.), cobalt metal forms no carbonyl, but does so at 100 atm. (1,470 lb.). Ten atmospheres gives best results.

Iron catalyst in the form of metal forms no oxygenated compounds, Fischer finds, but hydrocarbons entirely. In the form of carbide or carbonyl of iron some oxygen-containing products are formed. The product formed with iron catalyst is more unsaturated and of higher octane number than that formed by the other catalysts, and is of course more useful as intermediate in the synthesis of other hydrocarbon derivatives. Charge mixtures should be richer in CO than the 1:2 ratio of CO to H_2, for the best results using an iron catalyst. An interesting fact

is the production of mainly high-melting paraffins with ruthenium as catalyst, these paraffins melting as high as 134° C. (273.2° F.). Such materials are extremely useful in certain types of industrial applications, such as high-frequency electrical uses.

Synthesis of High Antiknock Hydrocarbons

Fischer and his collaborators, after years of research, report that high percentages of isoparaffins, aromatics, etc., can be made with one passage of the reaction gases over the catalyst. In one instance they produced a light fraction of which the C_4 portion was 90 per cent isobutane. Aromatics or naphthenes or both are formed with one pass, and by reducing the pressure to atmospheric they formed gasoline instead of synthol (mainly methyl alcohol) as formed at higher pressures. The presence of small amounts of alkali oxides such as those of sodium, lithium, potassium, rubidium, and caesium appears to prevent the formation of methanol (CH_3OH). Fischer lists 18 or 20 syntheses and products which may use this synthesis to make their intermediates, without exhausting its possibilities.

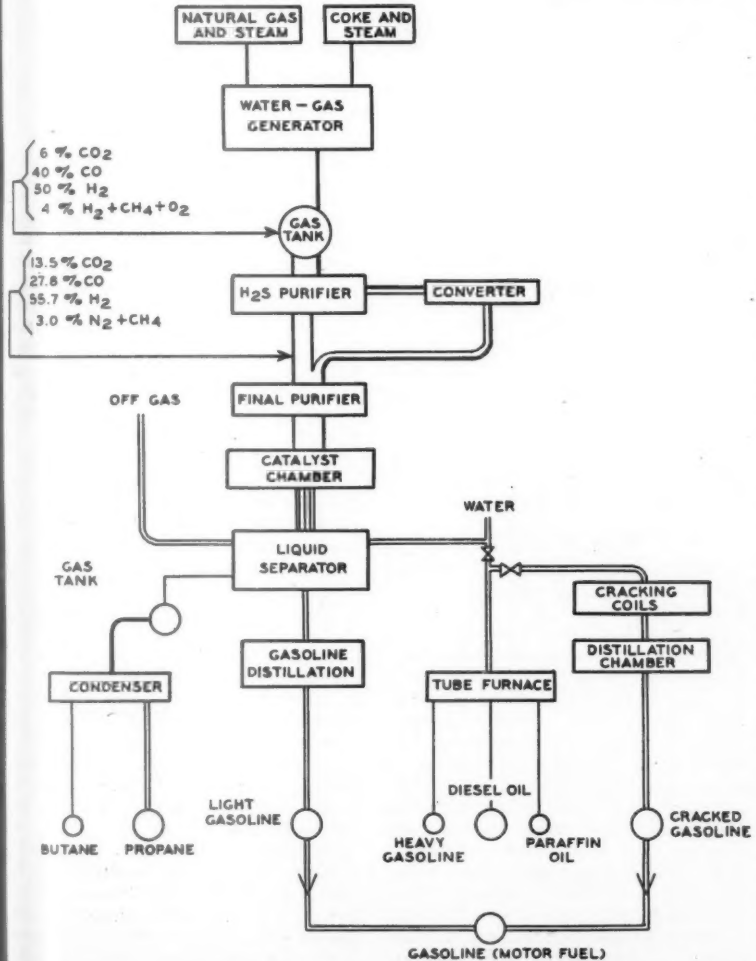
In 1935 (2-33) the best mixture of CO and H_2 to use in the synthesis of gasoline was reported to be 29 per cent CO, 58 per cent H_2, the remainder CO_2 and inerts, with a cobalt catalyst which yielded a product 62 per cent of which boils between 30° C .and 200° C., (86°-392° F.) 4 per cent below 86° F., and 23 per cent above, with 14 per cent solid paraffins. The catalyst was cobalt-thorium oxide on kieselguhr, and the main fraction 86°-392° F., contained 30 per cent of olefins. This catalyst gave 110 g. of product per cubic meter of gas for a period of 60 days, when its efficiency gradually decreased. It is reported elsewhere that 190 g. per cubic meter of gas is a theoretical yield. Good lubricants are made by condensing the olefins with anhydrous $AlCl_3$ directly or by chlorinating and reacting with aromatics in the Friedel & Crafts synthesis. These researchers believe that the mechanism of formation is conversion of CO to $—CH_2—$, with subsequent condensation. In this regard a patented claim (2-66) proposes that the synthesis be carried out at 5-500 atm. pressure and 150°-500° C. (302°-932°F.), with a catalyst of the Eighth Periodic Group type, with gases composed of four parts of CO and six parts of H_2, plus varying amounts of CO_2. Thus a surplus of carbon oxides above the 1:2 ratio with hydrogen is maintained. A further stipulation is that at least a part of the unreacted gases shall be recycled.

In still another method (2-29) CO is hydrogenated in the presence of metals the oxides of which are not reduced under the reaction conditions. The products from this reaction are separated into two fractions, the lighter boiling below 115° C. (239° F.), the heavier fraction boiling above that temperature. The lighter fraction is treated with aluminum oxide, Al_2O_3, in a copper-lined chamber at 420° C. (788° F.), to form a preponderance of olefins and isoolefins. The heavy cut is hydrogenated with H_2 in the presence of a molybdic oxide-on-activated-carbon catalyst at 150 atm. (2,205 lb.) per sq. in. and 400° C. (752° F.).

One of the apparently most important processes outlined in the literature and discussed widely, it is understood, is that (2-74) in which CO and H_2 are reacted in presence of a "carried powdered catalyst," and with a "heat remover" circulated through or around the walls of the reaction chamber to control the temperature and carry away the heat generated by the reaction.

In still another method (2-34) the ratio of CO to H_2 is maintained greater than 1:2 to favor the formation of "gaseous olefins and CO_2" and at the same time retard the formation of volatile or gaseous paraffins like CH_4, C_2H_6, etc. This tendency is correspondingly reversed by excess of H_2 over the 1:2 ratio. Oil formation, that is, heavier oils than light gasoline, increases with higher CO concentration. Dilution of the gases with nitrogen or any inert gas also reduces the oil formation by reducing the partial pressure of the CO present. It has been found (2-35) that CO and CO_2 may be reduced with hydrogen even in the absence of catalysts at 600°-700° C. (1,112°-1,292° F.), and 70-80 atm., and up to 300 atm. (4,500— lb.). A molybdenum catalyst was found best for the formation of methane; a silver catalyst also formed much ethane at elevated temperatures and pressures.

Several years ago (2-39) work was



The essential steps in a Fischer-Tropsch synthesis to make motor fuel, diesel oils, and other hydrocarbon products are shown in this flow chart of one arrangement of the process. [Cf. Egloff, Ind. Eng. Chem., Vol. 30, 1091 (1938)]

carried out in which 80 per cent of the product from use of a nickel catalyst boiled below 200° C. (392° F.). This portion of the product included hydrocarbons from C_5 to C_{11}. This nickel catalyst gave a product 90 per cent of which was saturated, paraffinic material, therefore presumably low in antiknock properties. A cobalt catalyst on the other hand used at 1 atm. pressure showed a yield high in olefins (57 per cent), with little if any aromatics or naphthenes. Interestingly enough, very small amounts of H_2S or CS_2 increased the activity of a Ni-Mn-Al_2O_3 catalyst; greater amounts poisoned the catalyst indicating that promoters containing sulfur can be used but must be added carefully and sparingly. When passing 4 l. of charge gases per hour over the catalyst, a mass containing 2 g. of Ni showed satisfactory activity at 200° C. (392° F.) to produce 135 cc. of product per cubic meter of gas, as compared to the Fischer determined theoretical yield of 190 cc. per cu. m. The CO:H_2 ratio of 1:2 to 1:2.1 was found best for making liquid "benzine" under these conditions with the Ni catalyst, excess of H_2 above that approximate value fostering excessive methane production, presumably by breaking the —CH_2— chain and hydrogenating to methane because of the excess hydrogen.

Temperature Control Important

To produce hydrocarbons other than the low-octane number paraffins Fischer and collaborators (2-40) treated a 1:2 CO-H_2 mixture over a copper-free nickel-thorium oxide catalyst at 180° C. (356° F.) which first produced methane which was recycled to form higher hydrocarbons. Eventually benzene, C_6H_6, was found in the product. This catalyst is made by suspending kieselguhr in water, adding nickel and thorium nitrates, precipitating these as the oxides with caustic soda and coagulating the oxides in the kieselguhr, washing and drying the mass, and reducing the nickel oxide to metal in a stream of hydrogen at 350° C. (662° F.). Again a 1:1 mixture of CO and H_2 plus some CO_2 was passed over an Fe-Cu-KOH-kieselguhr catalyst at 253° C. (487.4° F.), and the yield was decreased with increase of CO_2 content of the charge gases. Increase of the alkali —KOH— present increased the yield when CO_2 was present, and pretreatment of the catalyst with CO_2 before starting a run reduced the catalyst's activity.

Controlling the reaction temperature has a very important effect on the reaction rate and the products formed. A recent patent (2-58) shows the use of a cooling medium such as water, passed through tubes in the reaction zone to keep the temperature regulated within the desired range. Another American patent (2-62) "oxidizes" light hydrocarbons such as methane and natural gas, catalytically under carefully controlled conditions at 1,000° F. or higher. These CO + H_2 mixtures are treated catalytically to make hydrocarbons at 375°-425° F., recycling the unreacted vapors and recracking the gaseous hydrocarbons to form more CO and hydrogen as charge stock. The importance of removal of exothermic heat of reaction is indicated in a patent (2-65) which directs the passage of reaction gases alternately through reaction zones and through zones containing noncatalytic material, removing the reaction heat carried by the gases through the walls of the noncatalyst-containing chambers. Production of hydrocarbons containing appreciable percentages of olefins, naphthenes, isoparaffins and some aromatics is claimed (2-66) by passing four parts of CO and six parts of H_2 (volumetric) over a suitable catalyst at 150°-500° C. (302°-932° F.) and at pressures of 5-500 atm. (approx. 75-7,500 p.s.i.), along with smaller amounts of CO_2; a portion of the unreacted gases is recycled.

Pretreatment of the charge is recommended by a British patent (2-67), by passing it over finely divided bauxite or quartz at 1,000°-1,250° F., then over iron oxide to remove sulfur, then cooling them and passing over a cobalt-thorium oxide catalyst at 180°. Formation of low-molecular-weight hydrocarbons in the synthesis is reduced, it is claimed, in a British patent (2-68) by adding aromatics—cyclics—in the reaction zone, such as benzene, xylene, cyclohexane, etc. Gasoline hydrocarbons are produced (2-69) by passing a CO-H_2 mixture at 225° C. (437° F.) over a catalyst made of iron and copper oxides precipitated on diatomaceous earth (kieselguhr) along with boric acid and small amounts of activators such as alkalis.

Conversion of Natural Gas

More recent patent literature gives attention, especially in the United States and Britain, to conversion of light hydrocarbons. One inventor outlines the operation of the Fischer-Tropsch synthesis by oxidizing sulfur-free light hydrocarbons, methane and higher, with steam at 1,200° 1,500° F., with a nickel catalyst. The CO and H_2 mixture so formed is mixed with "unpolymerizable hydrocarbons" and contacted with an Eighth Periodic Group metal catalyst at 400° F. to form hydrocarbons. The fixed gases formed are recycled to the first step to form CO and H_2.

Innumerable combinations of catalysts, temperatures, pressures, reaction times, charge gas composition, catalyst promoters or activators, cooling methods, and temperature-control methods are employed, as found in the literature. Relatively little information has come out of Germany in recent years on their practices. Germany is interested mainly in converting coke-oven gases to liquid hydrocarbons, less importantly in natural gas. British and American technologists are interested in converting methane and other light natural and refinery gases into liquids either as fuels per se or as intermediates for chemical, fuel or lubricant syntheses. Consequently the technology developed is somewhat different in details, although practically identical in purpose and products formed. One claim is the synthesis of liquid, solid or liquefiable hydrocarbons by treating mixtures of CO and H_2 over an Fe catalyst at 220°-320° C. (428°-608° F.), and 30-3,000 p.s.i. This process activates the Fe catalyst by heating it in the presence of CO and H_2 at 240° C. (464° F.) and at pressures considerably lower than that employed in the synthesis operation (2-73).

Catalysts, Operating Conditions

In another instance (2-75) the synthesis is carried out with a Co-thorium oxide catalyst on kieselguhr to form "benzine" or gasoline hydrocarbons at temperatures above 150° F., controlling the temperature rise and keeping the gases in contact with the catalyst for a period of more than 45 seconds. Not so much discussion has been given to the effect of time of contact on the product made but apparently length of time of contact increases the molecular weight, other conditions being approximately equal. Pressure differences are important also; one patentee (2-76) recommends the precipitation of "a reducible Co compound" in solution, slowly over a period of more than 3 hours; CO plus H_2 mixture is passed over this catalyst at 160°-250° C. (320°-482° F.) and 30 p.s.i. to form low-boiling hydrocarbons. To make solid hydrocarbons, presumably paraffin waxes, a pressure of 5-50 atm. (75-750 p.s.i.) is maintained. Control over the formation of types of hydrocarbons, with emphasis on olefins and multicarbon atom molecules is exercised in another process (2-77) by introducing a mixture of gases with an excess of CO, i.e., more than the 1:2 ratio of CO to H_2, separating a recycle gas rich in CO and adding it to the fresh charge to maintain the excess of CO.

Temperature control is obtained in various ways One inventor (2-80) forms a solution of CO and hydrogen in a hydrocarbon liquid oil and passes this solution in indirect heat exchange with the reacting components in the reaction chamber, afterward sending this same solution into the chamber to react in the presence

of the catalyst. In another version (2-82) temperature is controlled by circulating a liquid at the desired reaction temperature through the reaction zone in heat exchange relation, and periodically adding to the liquid another portion of the same liquid at a temperature below the reaction temperature, thus absorbing some of the reaction heat in this cooler liquid.

This reaction is used also for synthesis of other products, such as oxygenated hydrocarbons, alcohols, aldehydes, etc., as outlined in Part 1 of this article. In one case (2-78) gases are reacted to form O-containing compounds of more than one carbon atom per molecule, and these gases are recycled in ratios of more than 20:1 to fresh feed, to produce various compounds. Analogously the primary products from the Fischer-Tropsch synthesis, controlled to form both olefins and isoparaffins, or one compound in one synthesis and the other in another differently operated, may be alkylated or polymerized or isomerized to make more complicated and more desirable products (2-79).

While not an exhaustive resume of this most important synthesis the above discussion gives some idea of the conditions employed in the production of different types of hydrocarbons and other compounds from light hydrocarbons or from coke, with steam. Part 3 of this article will discuss the numerous catalysts employed, their reaction effects, and their preparation.

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Operators May Expand Secondary Recovery

(Continued from page 43)

solution channels, fractures, etc., connecting the individual reservoirs. The answer to the difference is the functional geometry of the void space.

Additional conclusions contributed to the data by these two researchers is that the application of sand information directly to lime conditions is misleading, chiefly due to the differences in intergranular structure. Further information on the practicability of repressuring lime formations is needed. One of the major apparent difficulties is the inability to accurately correlate horizontal variations in permeability and porosity between locations as is usually possible in sand reservoirs.

It appears that limestone strata can be economically and practically repressured. It appears further that somewhat lower pressures, in relation to formation characteristics, will be applied in lime than in sand. And reversing the producing trend of a hypothetical lime well, a repressuring project would progress more rapidly toward exhaustion than would a sand project of the same extent.

QUESTIONS on TECHNOLOGY

by **W. L. Nelson**
Consulting Engineer

Water In Underground Gasoline Tank

We are having trouble with water in our gasoline. We do not see any way that water could be getting in our underground storage tank but our customers seem to be finding water.—A. N. M.

Water might accumulate in the tank from leaks, particularly with riveted tanks, or by having received a shipment of wet gasoline, or by condensation of moisture from air, but it would seem that such conditions could be checked or eliminated. Plain leaks would seem to be the most logical source of water. Leaks could be detected by breaking into the piping system at a point as near the tank as possible so that leaks in the piping system can be eliminated from consideration, and then putting a very small air pressure on the empty tank. Even slight decreases in pressure, detected by a manometer or sensitive pressure gage, indicates a leaky tank. Obviously, great care must be taken not to burst the tank by using too high a pressure. Most tanks are not built for internal pressures of more than 2 or 3 lb. and the strength of the tank should be carefully computed; nor is it necessary to use a high pressure for the test.

There is little chance that your refiner sent you wet gasoline, and if so, the small amount of water so introduced would be worked out of the system after a short time or could be removed. The solubility of water in gasoline ranges from about 0.004 per cent at 50° F. to about 0.007 per cent at 67° F., whereas at 158° F. the solubility is about 0.03 per cent. Thus, it would be possible to introduce about 1 lb. of water into the tank with each 1,000 gal. of gasoline, if hot gasoline were delivered to a much cooler storage tank.

Finally, each time the tank is emptied air flows into the tank carrying some water vapor with it. If the humidity of the air is high and the tank is cool, a small amount of condensation will take place with each filling. For 1,000 cu. ft. of 60 per cent saturated air at 90° F. (0.019 lb. water per lb. dry air) being cooled to 50° F. (0.008 lb. water) the condensation of moisture would amount to 0.78 lb. Thus, a 10,000-gal. gasoline tank could accumulate about 1 lb. of water per filling under the conditions given above.

Natural Gas Books And Engineering

Frequent inquiries are received by this department for books pertaining to natural gas, its properties, transmission, compression, processing, uses, etc. For this reason a library search has been made to ascertain what books are available and the main reference books are tabulated on this page.

Obviously there is a need for a modern book on natural gas, or perhaps several of them covering such subjects as transmission and handling, gasoline plants, and natural-gas conversion and utilization. There are, however, good reasons why such books have not been written, primary among these being that there is nothing peculiar or particularly different about the handling of natural gas as compared with the handling of other gaseous and petroleum products. Thus, the transmission, compression and measurement of natural gas can be and has been handled by employing the regular knowledge of mechanical and petroleum engineers. Likewise, natural-gasoline plants and their operation requires a knowledge that is inherent to refinery or chemical engineers.

For general information about the compression and transmission or natural gas, the two books by Stephens (No. 26 and 27) are probably the most useful. For more mechanical or maintenance detail, the Pacific Coast Gas Association Handbook (No. 22) is probably best.

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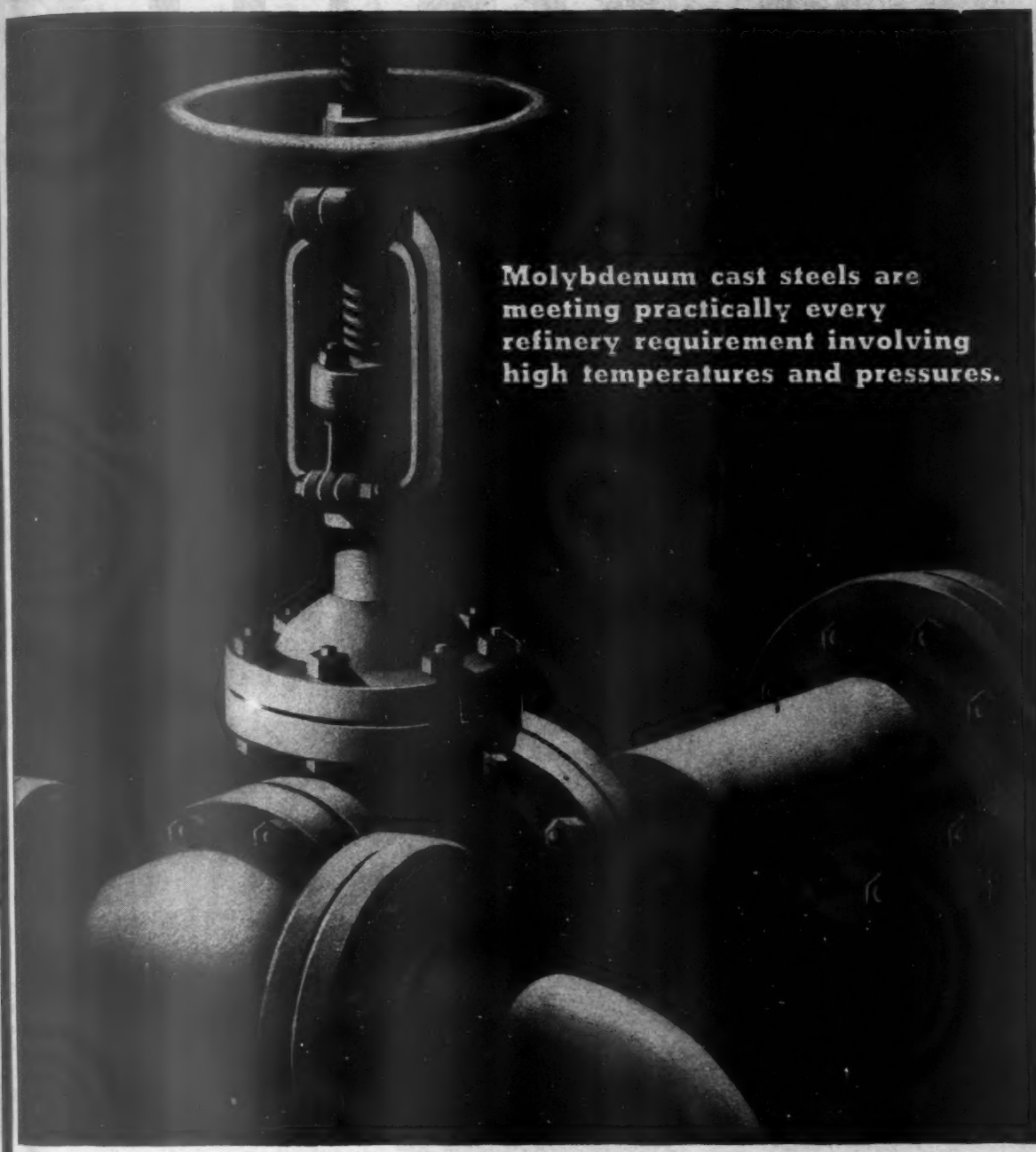
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Technical Groups Supervise Process Control at Jersey's Refineries

by R. S. Piroomov

Necessity, forced by competition, to reduce losses and operating costs, and to improve product qualities led Standard Oil Co. of New Jersey to organize the Process Control System. In this system groups are organized to study and systematize the various processes to simplify and make effective control methods. Processes for topping, cracking, treating, stabilization and other primary refinery processes have been studied and improved; new processes are dovetailed with existing processes by careful technical arrangement of the whole.

As petroleum refining grew from a series of relatively simple steps to a complex manufacturing process, increasingly close control over unit operations became a necessity. At refineries of the Standard Oil Co. of New Jersey, activities of technical men grouped under what is currently called the process control system are now indispensable to the efficient operation of the refineries. In the early 30's, technical men in refineries engaged in full-time study of refinery operations were almost nonexistent. However, the increasing difficulty of operating complicated refining processes economically under the prevailing keen competition made it imperative for refineries to undertake some definite program of action. For example, total fuel bills at the company's seaboard refineries amounted to several million dollars annually, representing about 27 per cent of total controllable manufacturing costs. To reduce this and other unit operating costs it became necessary to consolidate and modernize equipment as well as to improve the efficiency of existing operating units. To do this, meters, instruments, and automatic controls had to be installed and a system set up to digest the operating information in order to provide yardsticks or references of efficient operation for the guidance of operators. With a view to carrying this out the process control system was instituted.

Objective of Experiment

This system originated in the successful conclusion of an experiment carried out at the company's Baltimore refinery in 1934 in an attempt to discover and eliminate wasteful practices. The immediate objective of the experiment was to determine the possibilities of reducing the consumption of steam, fuel and chemicals by applying a technical approach. Concurrently it appeared desirable to improve the distribution of cost accounting figures in order to arrive at accurate unit costs for various operations. After only 6 months' effort this experiment, which required less than a dozen men and cost but a few thousand dollars, brought about an annual saving in utility costs alone amounting to many times the cost of the work at this relatively small refinery. It also confirmed the soundness of eliminating the rule of thumb method in refinery operations.

As a result of this experiment, all of Jersey's domestic and a number of foreign refineries have established the process control system. Since its inception, the process control groups, composed largely of technical graduates, have grown many fold. Of course, actual organization and immediate objectives differ at the different refineries depending on local situations and individual requirements. In order to promote wide dissemination of information and experience in this new field and to coordinate activities, a central process control group was established in the technical service division to report to the management. To promote this exchange of information and viewpoints still further, as well as to establish contacts between the technical men involved in this work, meetings at which technical problems associated with manufacturing operations are reviewed have been held regularly since 1937. These are attended by representatives of the several refinery groups and also by those from Standard Oil Development Co. and management.

In view of the few technical men engaged in technical work in the refineries when process control was started, the organization of the system had to be built from the ground up. The first year or two, therefore, was devoted largely to the training of young men and acquiring necessary knowledge and experience. Also, the emphasis was on the reduction of utilities and chemicals consumption. However, as the work progressed, the refinery technical men began to find themselves and were able to discharge more important problems. The scope of their activities has also widened and now they undertake studies of all types of refinery technical problems. Although at first the refinery personnel may have been skeptical of the value of these technical men, with time they have been able to sell themselves and their services, and now are very much a part of the refinery organizations. There is no question but that the establishment of technical groups in the various refineries has been one of the soundest investments made—for the returns have been many times the expense involved.

With the beginning of the war, the activities of the refinery technical men were turned toward increasing the production of essential

The author of this article was born in Tiflis, Russia, and received his elementary schooling there. He came to this country in 1920 and took both his bachelor's and master's degrees in chemical engineering from Massachusetts Institute of Technology, where he remained for 2½ years following graduation as an instructor in chemical engineering and research associate. He joined the Standard Oil Co. of New Jersey organization in January 1927, doing process engineering and plant scale test work on all types of refining processes. He has been a member of its technical service division since its formation late in 1927. In 1935 he was made head of the group which coordinates refinery process control activities and is currently chairman of the manufacturing technical committee.

war materials from existing and new equipment. It can be said, without qualification, that they have made and are making a major contribution to the war production program. At a recent manufacturing technical meeting, virtually the entire 5-day session was devoted to the exchange and discussion of experiences in maximizing the production of 100-octane aviation gasoline and components thereof.

In carrying out their activities, refinery technical men take full advantage of experience and information available in laboratories of the Standard Oil Development Co. and other divisions of the company. Their activities perhaps can best be illustrated by reviewing some of the problems with which they have been concerned.

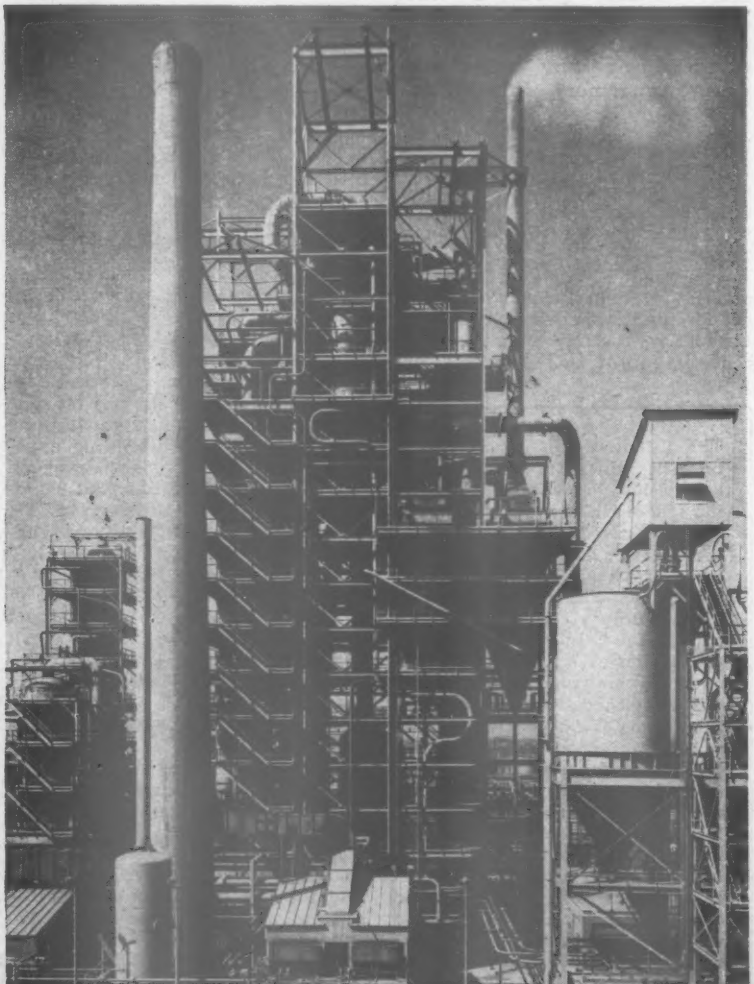
Immediately following Pearl Harbor an extensive test program was carried out on thermal reforming coils with a view of maximizing the production of butylenes for alkylation, polymerization and synthetic rubber. During 1942 and 1943 when there was a shortage of crude on the Atlantic Seaboard, every effort was made to find the best cracking conditions and feed stocks for the production of maximum butylenes per barrel of crude. At one refinery it was possible to increase the yield of butylenes from 1.5 per cent on crude to 4.0 per cent on crude. With somewhat more crude available later, effort was made to determine the proper operating conditions for the production of maximum butylenes from each cracking coil. As a result, where at the start of the war one refinery was producing 130 bbl. per day per coil, it is now producing 230 bbl. per day per coil.

It is not sufficient simply to produce butylenes; they must also be recovered in liquid form and of sufficient purity for subsequent processing. Figures at one refinery covering the first 4 months of this year indicate that 98 out of every 100 gal. of butylenes produced on cracking were recovered and fed to the polymerization units for producing aviation-gasoline blending agent and other essential products. This high recovery was made possible by a painstaking study of such operations as gas scrubbing, debutanization, stabilization, etc., and the successful establishment of automatic and other controls that work not only during the test periods but day in and day out.

The aid furnished by the refinery technical men is invaluable in starting up new units such as the fluid catalytic crackers, alkylation plants, isomerization plants, etc. A group of 3 to as many as 8 or 10 technical men is assigned to assist in the initial operation of these new plants. They secure important process information not otherwise readily available which is needed by the operators in adjusting operating conditions; and run tests on individual pieces of equipment. In spite of the fact that great progress has been made, much still remains to be learned particularly with respect to the best operating conditions for the newer refinery processes.

Selection of proper feed stocks and operating conditions for the catalytic cracking units is important in maximizing the production of aviation gasoline. All available laboratory, pilot-plant, and plant data must be studied and analyzed in order to assist the refinery management in the segregation of stocks and in setting operating conditions best suited to meet the requirements. Much depends on whether isobutane is needed for alkylation, whether butylenes are used for alkylation or hydrocodimer, whether there is a shortage of isopentane, on the octane number of marginal aviation base stock, and the critical specifications of the product. Since the nation-wide basic conditions and requirements underlying the production of aviation gasoline are subject to frequent changes, the refinery technical men must be constantly on the alert to advise management promptly of the desired changes in feed stock quality and operating conditions on the catalytic cracking units.

Some of the alkylation units in Jersey's refineries were designed for the production of 2,400 bbl. per stream day of aviation alkylate. As a result of the efforts of the refinery technical men in removing some of the bottlenecks, it has been possible to increase capacities to about 4,300 bbl. per stream day and a further increase may be possible. A valuable contribution to the war production program was also made by the test men at one refinery when they found a way of producing in a regular rerun pipe still a narrow amylene cut from thermally cracked distillates for use as alkylation feed. Thus this fraction, which



Fluid catalytic-cracking unit at a Standard Oil Co. of New Jersey refinery

ordinarily goes into motor gasoline, can be converted to much more than its equivalent volume of 100-octane aviation gasoline.

Plants Converted to War

Before our country's entry into war, the company was building two catalytic polymerization plants for producing high-octane motor gasoline. Because of the urgent need for aviation gasoline, however, they were converted, upon completion, to selective polymerization to produce aviation-gasoline blending agent. Extensive test programs were carried out at both units in an attempt to establish optimum operating conditions from the standpoints of production, quality and catalyst life. The results of this work as well as all subsequent data and the services of the technical men experienced in this field were made available to all refiners producing copolymer through the AGAC of the Petroleum Administration for War.

Since unit operating costs vary inversely with throughputs, the common effort at reducing costs is to remove bottlenecks that impede throughputs. While it is relatively simple to install larger pumps, lines and coolers, or even to enlarge a furnace, if necessary, it is not so easy to increase fractionating tower capacities. For years, therefore, the attention of technical men had been devoted to the problem of increasing the capacities of towers, and steady gains have been made in this respect. In this connection an important contribution was made in the last few years as the result of the difficulties experienced on several stills at one refinery. In cooperation with the research organization, the refinery set up experimental large-scale bell-cap trays operating on water and air, and also installed sight glasses on the sides of a tower in actual operation in order to observe the vapor-liquid interaction on bell-cap trays. As the result of this work, a new bell-cap design was incorporated in a new crude pipe still at another refinery, and this pipe still has operated at 45,000 bbl. per stream day as compared with 32,000 bbl. per stream day called for by design. Indications are that tower capacities as high as 60,000 bbl. per stream day can be obtained. This, of course, means lower investments in the future and also the possibility of securing additional distillation capacity in existing units at a cost lower than for new units.

Control of Oil Losses

Another important activity comprises the control of oil losses. Oil is lost by evaporation from storage tanks, in refinery separators and sewers, and in blending light stocks; oil is lost because of leaks from pump glands and stuffing boxes and valves; also because of inaccurate measurements of receipts and deliveries. In the aggregate, the total loss of oil may amount to hundreds of thousands of barrels per year at large refineries. With the great demand for petroleum products there is, of course, more than an economic inducement for minimizing these losses. For over 4 years technical men have been engaged in developing the means of determining the magnitude of over-all refinery losses and means of overcoming them once their sources have been established. This work is continuing and the future is likely to see an expansion of this effort until satisfactory control is established. In the past 2 years the conservation program has been expanded to include transportation as well as manufacturing operations in an effort to coordinate all conservation activities.

An important function for which the refinery technical men are well qualified because of their intimate knowledge of the capacities and limitations of refinery equipment, is the preparation of process layouts. Whenever new processing steps or new equipment are introduced in a refinery, it is essential to dovetail them with existing operations and equipment in the most effective manner. For instance, the successful completion of the new aviation-gasoline facilities at the various refineries would have been seriously handicapped had it not been for the thorough knowledge of the existing equipment by the technical men in the respective refineries.

Further examples of the type of work currently being carried out by the refinery technical men could be added. To summarize briefly, their activities embrace (1) process test work, (2) trouble shooting and removal of bottlenecks; (3) determination of limitations to throughputs, fractionation, quality and yield; (4) determination of optimum operating conditions to meet changing feedstock supplies and product requirements; (5) development of controls for utility, fuel and chemicals consumption; (6) development of controls of oil losses; (7) conducting surveys on steam, water, combustion, heat exchangers, coolers, pumps, etc.; (8) preparation of process layouts, and (9) collection of certain process information for the cost and yield department to permit more accurate unit cost figures.

In brief, the refinery technical men carry out practically all process technical work and act in a technical advisory capacity to the refinery management and other refinery departments on technical problems associated with all manufacturing operations. The success of the system lies in close cooperation between the technical men and the several operating departments; ineffective cooperation means poor results. As a team, these groups have made substantial advances in efficient and economical operations, and have amply justified the organization of the process control system.

Aliphatic Hydrocarbon Derivatives Available In Quantity

NEW aliphatic compounds consisting of the even-numbered normal hydrocarbons from C_4 through C_{18} and the corresponding olefins, alcohols, ethers, mercaptans, thioethers, disulfides, and sulfonic acids have been developed by the Chemical Division of Connecticut Hard Rubber Co., New Haven, as a result of its research work in the synthetic-rubber field. Most of these new chemicals are available in commercial quantities and are supplied in various grades from technical to "fine chemical."

The saturated n-alkanes are suggested for use as organic intermediates, laboratory solvents, and as standard hydrocarbons. The olefins, with the double bond at the first carbon, are interesting in organic synthesis, particularly as a starting material for dispersing agents, resins, oil additives, pharmaceuticals, and insecticides. Certain branch chain olefins, isomeric with the n-compounds of this series are available for laboratory research. The alcohols are also suggested as intermediates for chemical synthesis and for use in cosmetic preparations.

The aliphatic ethers are an interesting series which can be used as plasticizers, impregnating agents, solvents, heat-transfer liquids, as well as in the cosmetic field.

The high-purity aliphatic mercaptans present possibilities as polymerization conditioners, intermediates for synthesis, corrosion inhibitors, oil additives, insecticides, flotation agents, and alarm odorants.

The thioethers and the disulfides are suggested for use as plasticizers, stabilizers, insecticides, oil additives, and flotation agents. The aliphatic sulfonic acids, available only in experimental quantities, are of interest as hydrogen soaps, and the salts as stabilizers, dispersing agents, wetting agents, and oil additives. The corresponding sulfones are available in limited amounts for experimental work.

J. S. Griffith, landman at Roswell, N. M., for Humble Oil & Refining Co. during the past 11 years, has been transferred to the Midland, Tex., office.

PRACTICAL REFINERY ENGINEERING

No. 11—Pressure Drop Through Heat Exchangers

by Paul Buthod and B. W. Whiteley

IN any type of heat exchanger, the most efficient heat-transfer rates are attained at high fluid velocities. High rates of fluid flow, however, result in increased pressure loss through the exchanger and in actual design and operation a compromise must be made between these two factors.

Allowable pressure loss through a heat exchanger will vary over a wide latitude according to the type of installation and operating conditions. In some instances pumps may be used while in others only a low-gravity head is available for fluid flow. Under such conditions it is desirable to calculate both the heat-transfer rates and pressure drops for various installations, in order to attain the most efficient operating conditions. Such calculations include the pressure drop on both the tube and shell sides.

In the ordinary tubular-type of heat exchanger, the total pressure drop through the tube side includes not only the friction loss in the tubes proper but the header-box pressure losses which are caused by a combination of contraction, enlargement, and reversal of flow in each pass.

Expressed mathematically:

$$\Delta P_t = \Delta P_1 + \Delta P_2$$

Friction loss in the tubes may be calculated by a modified form of the Fanning equation.

The pressure drop due to header-box losses has been found to approximate three velocity heads per pass or:

$$\text{Loss (feet of head) per pass} = \frac{3\,u^2}{2\,g}$$

Taking into consideration the number of passes and expressing the pressure loss in lb./sq. in. units:

$$\Delta P_1 = 0.0203\ u_2\ p\ s$$

The velocity and specific gravity of the fluid are evaluated at the average fluid temperature between the two ends of the exchanger.

The accompanying chart (Fig. 1) may be used to determine header-box pressure losses in commercial heat exchangers. It will be noted that at low velocities the header-box loss is of a minor nature. At higher velocities, however, and for a large number of tube passes, this portion of the total pressure drop rapidly increases to the point where it may become appreciable

In obtaining a mental picture of pressure loss in comparison with heat transfer rates it is often advantageous to think directly in terms of linear velocity. Consequently, the flow rate on the accompanying chart has been plotted in feet-per-second units.

If the mass velocity on the tube side has been obtained in previous calculations, the linear velocity may be calculated by means of the following equation:

$$u = \frac{V}{3{,}600\,\rho} = \frac{V}{224{,}640\,s}$$

where the symbols are explained in the accompanying notation.

The use of the accompanying chart is illustrated by the following examples:

Example 1.—Find the header loss on the tube side of a heat exchanger handling 25,000 lb. per hour of distillate oil. The oil enters at 300° F., leaves at 150° F. and the specific gravity of the oil at the average temperature of 225° F. is 0.825. The exchanger is constructed with three tube passes and each pass consists of 12 tubes (⅝-in., 16-gage).

Solution.—The average volume of oil handled per hour is:

$$25{,}000 \div 0.825 \times 62.4 = 486 \text{ cu. ft. per hour}$$

The average volume of oil handled in each tube per second is:

$$486 \div 3{,}600 \times 12 = 0.01125 \text{ cu. ft. per second}$$

From a table of condenser tube data, the cross-sectional area of a ⅝-in. 16-gage tube is found to be 0.1924 sq. in.

The average linear velocity, then, is:

$$u = 0.01125 \times 144 \div 0.1924 = 8.43 \text{ ft. per second}$$

Entering the accompanying chart on the bottom scale at 8.43 ft. per second, rise vertically to a specific gravity line of 0.825. Then move horizontally to a line for three tube passes. From this point rise again vertically to the top scale and read a header loss of 3.6 lb. per sq. in. It should be noted that this pressure loss does not include the friction drop through the tubes, which must be calculated separately.

Example 2.—A 12-ft. single-pass heat exchanger consisting of 44 tubes in parallel (¾-in. 16-gage) is designed to handle 10,000 bbl. per day of crude oil on the tube side. The oil has an A.P.I. gravity of 40° at 60° F. and will enter the exchanger at 100° F. and will leave at 210° F. The pressure drop through the tubes at this rate of flow is calculated to be 2.5 lb. per sq. in. Find the total pressure loss through the tube side of the exchanger.

Solution.—The total pressure loss consists of the friction drop through the tubes plus the header loss.

From a chart showing correction of gravities for various temperatures, the specific gravity of the oil at the average temperature of 155° F. is found to be 0.79.

The flow rate through an individual tube is:

$$\frac{10{,}000 \times 5.62}{44 \times 24 \times 3{,}600} = 0.01475 \text{ cu. ft./sec.}$$

The cross-sectional area of a ¾-in. 16-gage tube, from a table of condenser tube data, is found to be 0.3019 sq. in.

The linear velocity, then, is:

$$u = 0.01475 \times 144 \div 0.3019 = 7.04 \text{ ft./sec.}$$

From the accompanying chart the corresponding header loss for a 0.79 specific gravity and a velocity of 7.04 ft. per second is found to be 0.78 lb. per sq. in.

The total pressure loss through the tube side of the exchanger, then, is:

$$\Delta P_t = 2.5 + 0.78 = 3.28 \text{ lb. per sq. in.}$$

Notation:

- ΔP_t = total pressure drop, lb./sq. in.
- ΔP_1 = header box pressure drop, lb./sq. in.
- ΔP_2 = pressure drop through tubes, lb./sq. in.
- u = linear velocity through tubes, ft./sec.
- g = acceleration due to gravity, ft./sec.^{2}
- p = number of tube passes
- s = specific gravity of fluid
- ρ = density of fluid, lb./cu. ft.
- V = mass velocity, lb./hr.-sq. ft.

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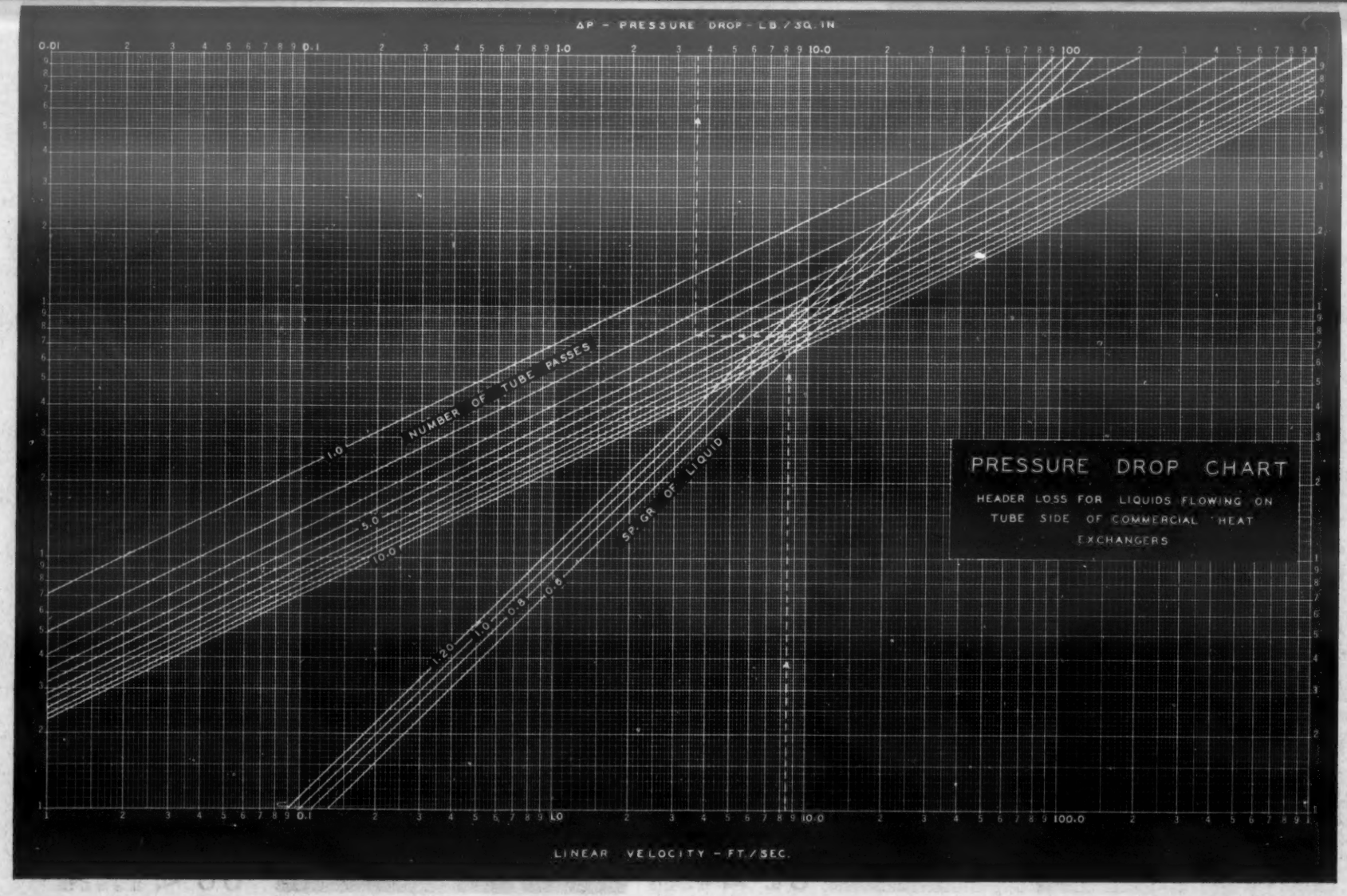

ΔP - PRESSURE DROP - LB./SQ. IN.
0.01
0.1
1.0
10.0
100
NUMBER OF TUBE PASSES
1.0
5.0
10.0
SP. GR. OF LIQUID
1.20
1.0
0.8
0.6
PRESSURE DROP CHART
HEADER LOSS FOR LIQUIDS FLOWING ON TUBE SIDE OF COMMERCIAL HEAT EXCHANGERS
0.1
1.0
10.0
100.0
LINEAR VELOCITY - FT./SEC.

Fig. 1

OPERATING IDEAS

Continuous Drip Oil Feed For Chain Drive

INTERMITTENT oiling has given away to continuous drip oilers fed from a central reservoir. In the accompanying picture is shown an improvised oil feed line for a chain drive to the draw works. All chains on this rig run inside guards, but in this case a section has been removed for repairs on the rig.

Portable Orifice Meter For Checking Wells

BECAUSE of mercury thefts from permanent meter installations at more or less remote locations, an operator in a coastal Louisiana field makes use of a portable orifice meter which is carried by the switcher on his rounds to various wells to check production. Fittings are provided on meter runs for quick installation of the meter. The majority of wells are some distance removed and cannot be watched from the office.

Oil Skimming Vat for Water Disposal

THE accompanying picture shows a skimming vat which an operator in a North Texas field has devised to recover any oil carried in the salt water going to the disposal system. The vat consists of a small rectangular tank (foreground) into which the four 4-in. lines from the field empty. The main flow water drains continuously off the bottom through a ditch to a reservoir. The surface scum is run off the top through a connecting line to the baffled settling and skimming tank in the background.

Old Rotary Chain for Guy-Line Tie-down

AFTER serving its useful life as a rotary chain, this piece of discarded equipment was pressed into a new job. It is shown looped around a derrick sill in place of a length of cut cable. The hook is guyed into the substructure of the power unit.

The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Volatile-Liquids Storage

PRESSURE storage or low-temperature storage is used for light gasoline, natural gasoline, butanes, bottle gases, and liquefied gases. These materials boil at atmospheric pressure and temperature or may even be gases. Obviously, low-temperature storage involves large refrigeration costs and hence a combination of refrigeration and pressure is often most economical. Refrigeration may be used with any of the following types of pressure storage.

(1) Atmospheric pressure — Refrigeration plant to condense the vapor that boils away.

(2) 2½-20 lb.—Spherical shapes and double-wall insulated vertical tanks.

(3) 25-100 lb.—Spheres and horizontal or vertical cylindrical tanks.

(4) 100 lb. and up — Horizontal cylindrical tanks (small or refrigerated) and cylinders.

(5) 500 lb. and up — Cylinders and small heavy spheres.

Selection of storage. — Vapor pressure and storage temperature are the main factors. At high temperatures the pressure (vapor pressure) exerted by a liquid on its container is very large, but it decreases rapidly with temperature, High pressure demands heavy plate and high steel cost. Low temperatures are also expensive because of the cost of refrigeration and of insulation. Economy lies between these two extremes and in addition a low temperature (a lower vapor pressure) may allow a cheaper type of construction, for example the substitution of Type (2) above for Type (3). Fig. 1 permits consideration of these economic factors. The pressure required must be based on the highest storage temperature anticipated, which may be even 140° F. in uninsulated cylindrical tanks exposed to the sun. The vapor's pressures of common petroleum mixtures are about:

	Reid V. P. at 100° F.
Light crudes	4-8
Gasolines	5-14
Natural gasoline	10-36
Bottle gas	50-90
B-B, mixed butanes	45-100
Refinery propane	120-240

Spherical storage and heads.—In ordinary cylindrical tanks the top and bottom (or the flat ends of a cylinder) scarcely strengthen the shell of the tank. The shell simply buckles when pressure is applied. In spherical storage the shell is rounded in a smooth manner to make direct connection with the top and bottom so that the steel in the top and bottom also carries some of the load. This construction not only permits the use of thinner plate because all the plate is under nearly equal tension but also permits higher pressures than otherwise would be economical. At the lowest storage pressures (2½ to 10 lb.) the most economical shape is a flattened sphere (Hortonspheroid) whereas at higher pressures (25-100 lb.) the most economical shape tends more and more toward a perfect sphere. For the same reasons, dished heads are used on cylindrical tanks and for extreme pressure, dome ends (half spheres) are used. Spherical shapes require less steel than other types but construction and insulation costs are higher. Thus, simple horizontal cylindrical and vertical cylindrical tanks with domed top and bottom are also economical particularly at low pressure or if refrigeration is employed. Refrigeration is usually accomplished by condensing and expanding part of the vapor that boils from the tank. In the extreme, liquid air or liquid natural gas have such high vapor pressures that they must be stored entirely by refrigeration with no attempt to hold a pressure.

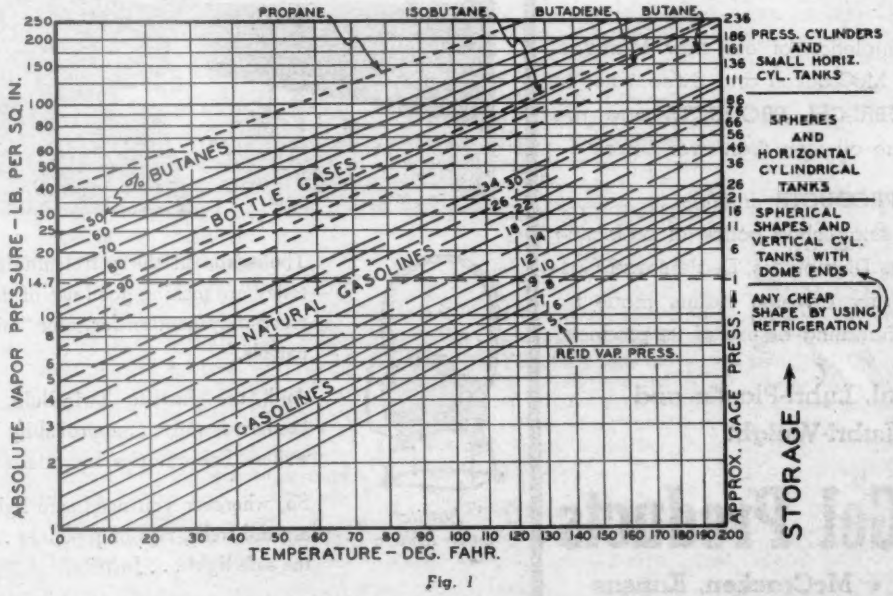
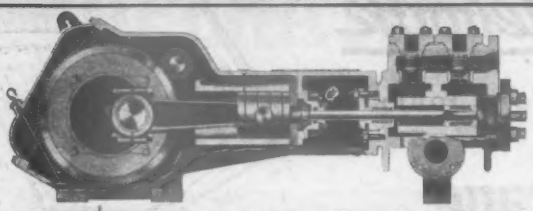


Fig. 1

No. 7 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

McGOWAN *Dependable* PUMPS



McGowan Power frame is heavily ribbed iron casting; liquid end is made from fine grained, controlled cast iron. Gears are continuous tooth herringbone. Pinion is forged integral with the shaft, which extends to both sides for connection to driver.

Pinion shaft floats on double row Timken roller bearings while crank shaft also turns in Timken roller bearings. Crank bearings are adjustable by means of shims. Cap does not support the weight of bearings, crankshaft and gear, as these are supported in separate housing, made larger for easy insertion of moving parts. Consequently pump is easily dismanteled. Liquid piston rod is removed from back of crosshead by removing piston rod cover and stuffing box in power frame.

Liquid end is duplex side pot type with suction on either side. Valve areas are ample and pot caps are sealed with metal covered gaskets. Liners are removable.

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PLUGGING BACK WITH CEMENT

PLUG-BACK operations are used in oil wells to shut off bottom water, to reduce the hole depth in order to produce from an upper horizon, and for various other purposes. Particularly in limestone fields where the pay section is highly permeable, plug-back methods have proved more successful than squeeze-cementing methods in shutting off bottom water. It is thought that when the permeability is high due to an almost cavernous pay section, squeezing pressures will force an excessive amount of cement into the oil-bearing section and hinder free flow of oil into the well after it has been recompleted. On the other hand, cement placed in the hole by plug-back methods is not forced into the formation enough to have a harmful effect on the oil pay.

In certain fields, difficulties have been encountered in obtaining successful plug backs in wells that have been shot with nitroglycerin or in wells that have been acidized. In these instances, the trouble more than likely results from incomplete filling of fissures and channels caused by the shot or the acid. The water is not excluded because it moves through the open fissures and channels around the cement plug and into the well.

In certain types of formations, however, it has proved desirable to discharge a small nitroglycerin shot at the upper portion of the formation to be plugged off. Under these circumstances, the purpose of the shot is to provide a wide place in the hole which will act as an anchor to hold the cement plug in place when the well is placed on production.

Similarly, for the same purpose, a rotary well-scraper may be used to enlarge the upper part of the section of hole to be plugged off. If there is a shale break or similar cap rock between the bottom water and the oil zone, reaming of the water sand immediately below the break may prove very effective in anchoring the cement plug and forming a better seal to exclude the water.

In sections of hole that are irregular because of caving, or because of having been shot with nitroglycerin, a caliper log may be taken immediately prior to the plug-back job. The results of such measurements are valuable in calculating the amount of cement required to fill the hole to a given depth.

Balanced Method

The balanced method is one of the most widely used of various plug-back methods. In using this method, tubing or drill pipe is run to the bottom of the well and then raised about 1 ft. off bottom. Mud or water (bentonite mud is usually preferable) is then circulated until the tubing and annulus are full of circulating fluid of uniform properties. The proper calculated amount of cement slurry is then pumped into the tubing and followed by the same circulating fluid that was used ahead of the cement slurry. It is important that the circulating fluid used in the tubing behind the cement be of the same density as that used ahead of the cement, since the method depends upon the cement slurry equalizing to the same level on the inside and outside of the tubing. Atmospheric pressure is exposed to both the tubing and annulus at the surface in order to allow equalization.

After equalization of the cement slurry, the tubing is raised to a point just above the desired top of the cement and the excess cement is circulated out of the hole. Usually, it is preferable to circulate the excess cement out by pumping down through the annular space and out through the tubing, since this allows quicker removal of the slurry with less likelihood of its setting before being removed from the well. However, when the lower end of the tubing is in open hole and the exposed formations show a tendency to cave, regular circulation down through the tubing and out through the annular space is better than reverse circulation.

Displacement Method

The displacement method is very similar to the balanced method, the only essential difference being that a measured amount of fluid is pumped into the tubing following the cement slurry. Since in this method the hydrostatic head is not depended upon to equalize the cement levels inside and outside the tubing, the annulus and tubing need not be exposed to atmospheric pressure at the surface and it is not essential that the circulating fluid be of uniform density. It is important that sufficient cement slurry be left inside the tubing that when the tubing is raised the cement to be left in the hole will not be contaminated by circulating fluid. Excess cement is removed by either regular or reverse circulation.

Pump-and-Plug Method

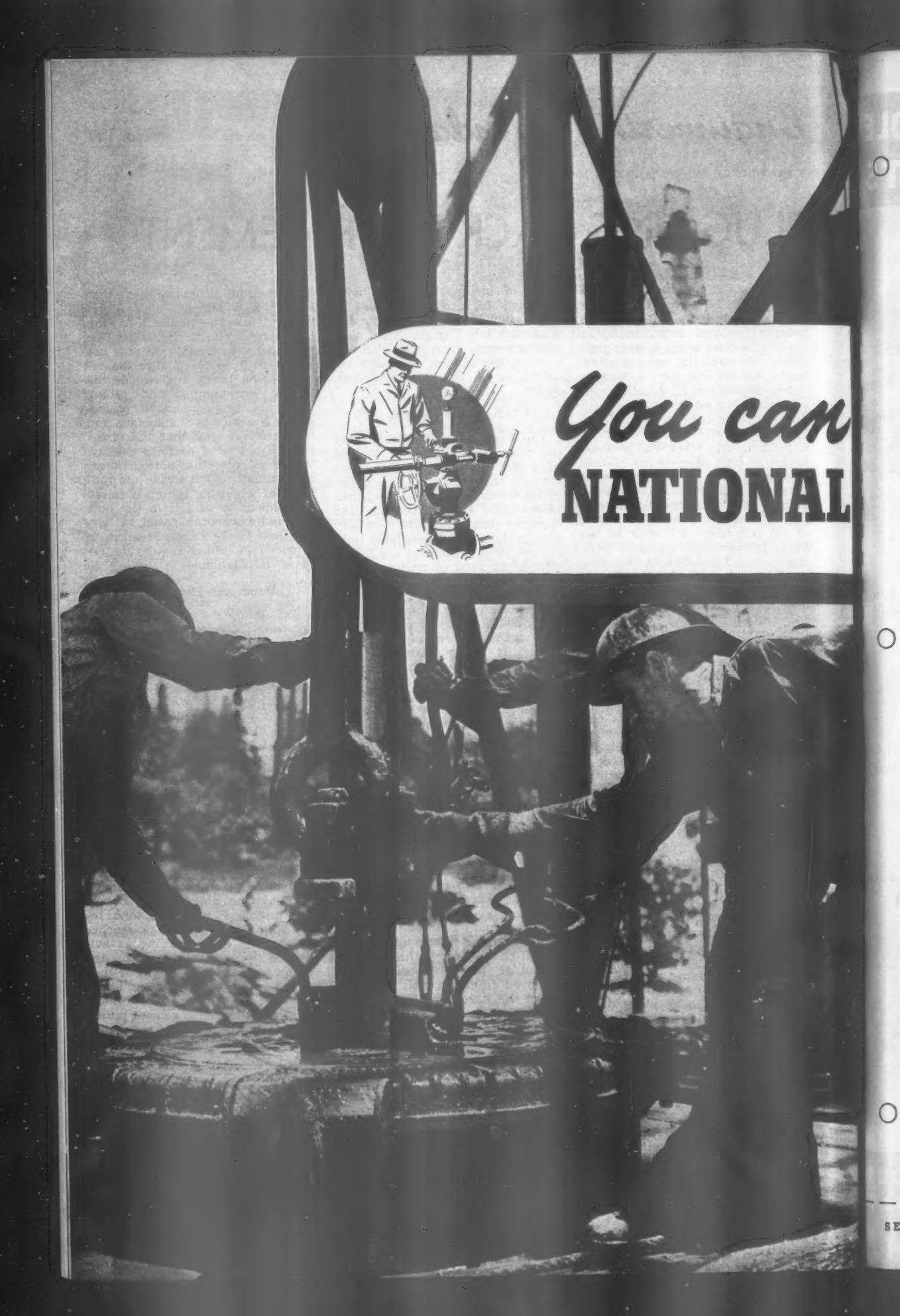
The pump-and-plug method is not as widely used as the other two methods just described, but in certain instances may be the most desirable plug-back method. Using this method, the tubing is run to the bottom of the well. A wooden cementing plug about 2 ft. long is placed in the tubing and followed by the required amount of cement. Then another wooden plug about 3 ft. long is placed in the tubing and enough cement slurry placed on top of it to fill the tubing to the intended top of the plug back. The whole column is then pumped down by following with circulating fluid. When the lower plug reaches bottom, the pump pressure rises. The tubing is then raised enough to allow the plug to pass out of the tubing. Pumping is then resumed until the other plug reaches the bottom of the tubing as evidenced by another rise in the pump pressure. The tubing is then raised to a point a few feet above the intended top of the cement plug and the excess cement pumped out of the hole by regular or reverse circulation.

References

Torrey, Paul D., "Selective Exclusion of Fluids From Wells," A.P.I. Dr. and Prod. Pract. 1939, pp. 205-251.

Parsons, C. P., "Oil-Well Cementing," The Science of Petroleum, Vol. 1, pp. 463-475.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma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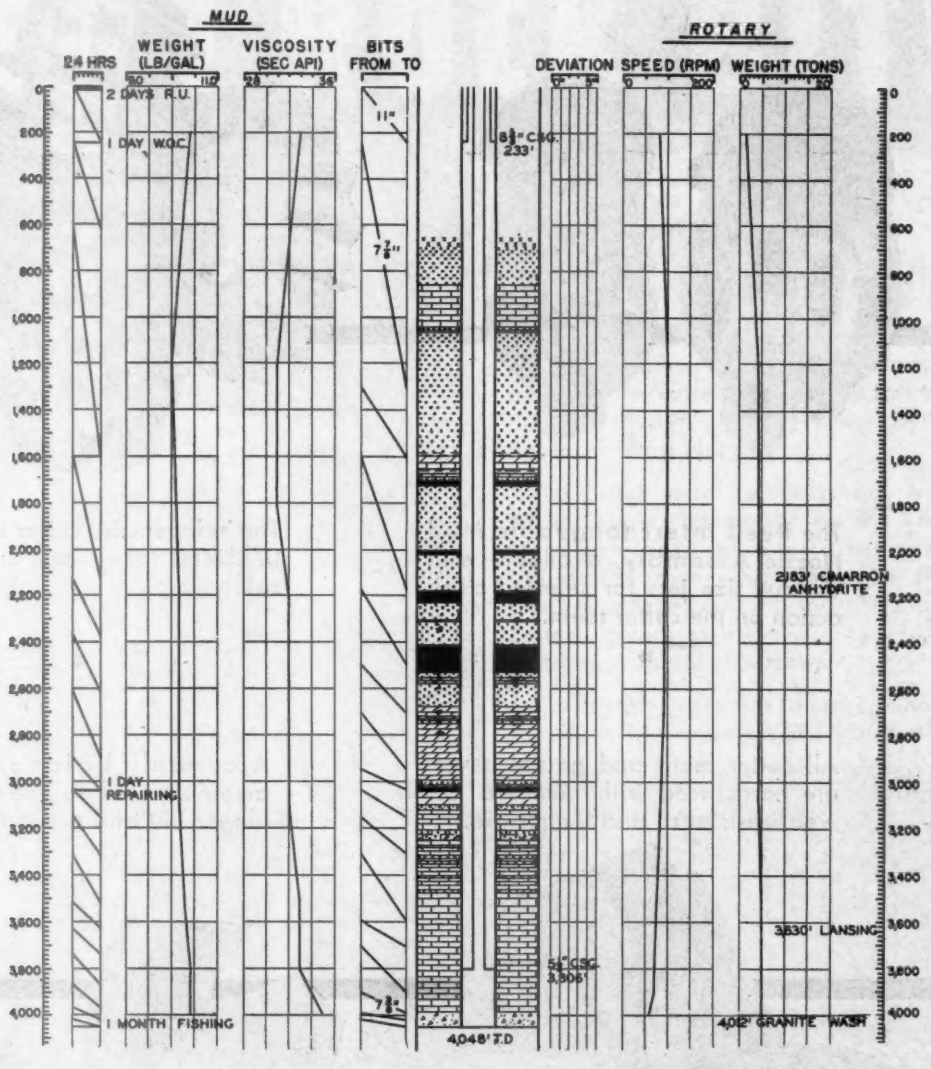
NATIONAL

Discovery Well, Adell Pool, Sheridan County, Kansas

CONTINENTAL OIL CO. 1 CRAMER
330 ft. S and E from NE cor. 11-6s-27w.
Elevation 2,627 ft.

CONTRACTOR
Company Tools



LEGEND: CHALK, SAND, LIME, SHALE, DOLOMITE, CHERT, ANHYDRITE, GRANITE WASH

DRILLING DATA

Type rig ..... Stratigraphic rotary*

Time record—	Hours	Days
Rigging up	...	1
Time spudded to T.D.	...	50
Bits run	294	...
W.O.C. (surface casing)	...	2
Electric logging	...	2
Circulating	12	...
Trips	45	...
S.D. for repairs	36	...
Fishing	...	1
Breaking down pipe and running oil string	7¾	...

*Light, slim-hole power rig used by company for shallow geological tests.

Cardwell drilling unit moved in to complete well after oil string cemented.

BIT SUMMARY

Type—	Number	Size (in.)
Rock bit	1	11
Rock bit	16	7⅞

MUD USED

Type—	Amount
Bentonite	43 sacks

CASING RECORD

Size (in.)	Weight (lb.)	Depth (ft.)	Cement (sacks)
8⅝	36	233	115
5½	14	3,806	300

COMPLETION

Type rig ..... Cardwell drilling unit*
Total depth (ft.) 4,044
Plug back total depth (ft.) 3,770
Perforated casing (ft.) 3,749-65
Number shots 30
Acid (gal.) 1,000
Type formation ..... Kansas City lime

*Contractor—Coffey Drilling Co.

PRODUCTION

Method ..... Pumping
Type of test ..... Physical potential
Time of test (hr.) 24
Potential (bbl. oil)) 840
Water 0
Gravity oil (at 57° F.) ..... 41.2°

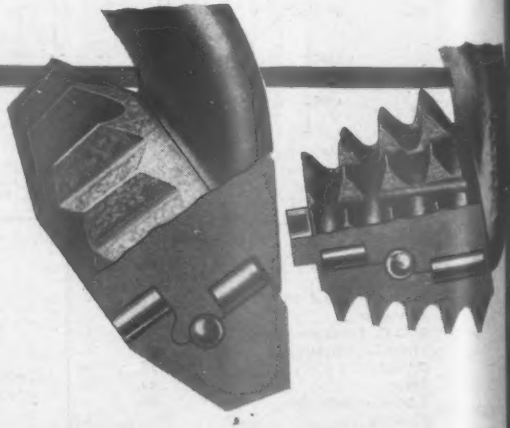
FOR FASTER—STRAIGHTER—FULL GAUGE HOLE *with* LIGHTER DRILLING WEIGHTS

The Reed Interchangeable Mud Nozzle Assembly, available with various size jets for selected slush action on the cutter teeth.

The independent cutter supports are UNITIZED for greater strength and safety.

All cutter teeth and gauge bevels are hard faced with "REEDITE" for wear resistance and longer life.

Accurately balanced bearing assemblies assure free cutter action, longer life and greater safety.



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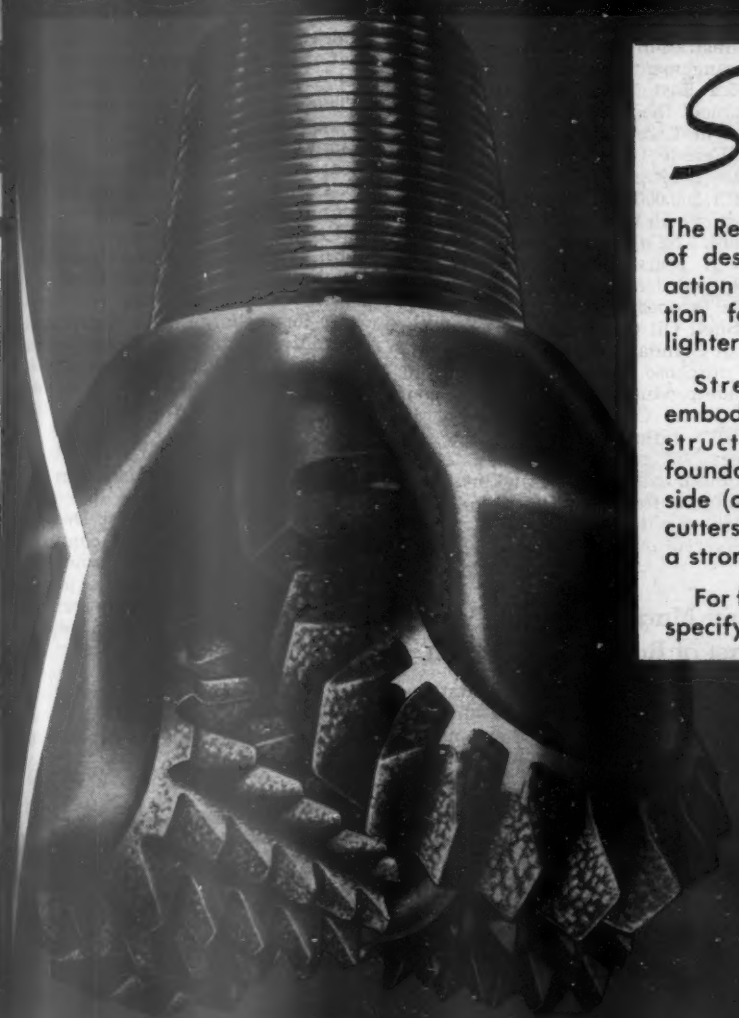

Speed WITH LESS WEIGHT

The Reed Rock Bit cross roller principle of design gives a chipping, tearing action of the cutter teeth on the formation for faster cutting speeds with lighter drilling weights.

Strength and safety, too, are embodied in this design as the construction assures a strong, safe foundation upon which to mount the side (or gauge) cutters and the cross cutters, giving to the entire assembly a strong, rugged structure.

For faster, straighter full gauge hole specify a specialized REED ROCK BIT.

Reed

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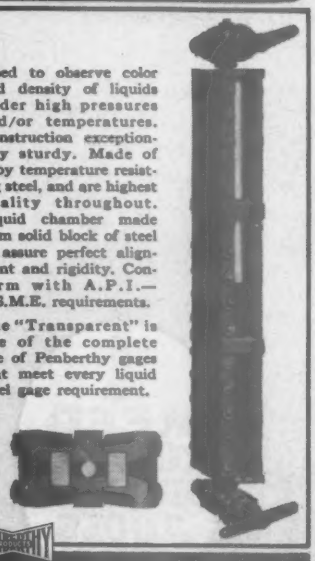
DROP FORGED STEEL
LIQUID LEVEL GAGES

Used to observe color and density of liquids under high pressures and/or temperatures. Construction exceptionally sturdy. Made of alloy temperature resisting steel, and are highest quality throughout. Liquid chamber made from solid block of steel to assure perfect alignment and rigidity. Conform with A.P.I.—A.S.M.E. requirements.

The "Transparent" is one of the complete line of Penberthy gages that meet every liquid level gage requirement.



PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

REFINING

Oil Supply for Two Plants Arranged for by PAW

FORT WORTH. — Petroleum Administration for War has completed arrangements through which crude from East Texas will be supplied to meet the needs of two refineries, one in Texas and one in Louisiana.

Humble Pipe Line Co. is to provide Danciger Oil & Refining Co. with 200,000 bbl. of crude monthly with which to operate its East Texas plant. The plant has been shut down for 4 years, but it is understood that war demand now makes it feasible to operate it.

Shell Oil Co., Inc., has contracted with Standard Oil Co. of Louisiana to purchase monthly 528,000 bbl. of crude produced in the Hawkins pool of Wood County for delivery to Shell's refinery at Norco, La., to meet the refinery's asphalt crude requirements. The Hawkins pool produces from the Woodbine sand a low-gravity crude. The oil will be delivered over a 12-month period.

First Magic-Bead Refinery East of Rockies on Stream

PAULSBORO, N. J.—The first refinery east of the Rocky Mountains to use "bead" catalyst in manufacturing high-octane gasoline for Allied air forces was put into operation here last week by Socony-Vacuum Oil Co., Inc. Wilbur F. Burt, director of the company and chairman of the manufacturing committee, said the new unit, the last on Socony-Vacuum's war building program, would turn out thousands of barrels of aviation gasoline daily with a rating of "100-octane plus."

Standard of Alaska Will Operate Canol Refinery

EDMONTON, Alta.—Standard Oil Co. (Alaska), with headquarters at Whitehorse, Y. T., will continue to operate and maintain the Canol refinery at Whitehorse and the pipeline system delivering crude from Norman Wells to Whitehorse and refined products to points in Alaska and Northwest Canada, according to an announcement by Northwest Service Command. The company will be responsible also for maintenance of the pipe-line access road from Norman Wells to the refinery, which is not a general transport highway, but was constructed so that the pipe line and pumping stations could be built and maintained.

The announcement explains that when the Canol project was first planned by the U. S. War Department early in 1942, the Standard Oil Co. of California was requested to operate and maintain the pipe line and refinery facilities upon completion. The company undertook the assignment on a nonprofit basis as a contribution to the war effort. In order to discharge the obligation of its contracts the company, which had not been set up to operate in Canada, formed a wholly owned subsidiary, Standard Oil Co. (Alaska).

The sole objective of this subsidiary is to operate and maintain the Canol refinery and pipe line as a contractor to the U. S. War Department. It is not engaged in commercial oil operation, has no ownership or proprietary interest in the physical facilities, the crude petroleum or the refined products, and has no jurisdiction over sale or price.

Neither has the Alaska company any corporate or operating tiein with Imperial Oil, Ltd., which produces the Norman Wells crude and

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pumps it under the Mackenzie River under supervision of the U. S. Army authorities to the Camp Canol tank farm, where Standard Oil Co. (Alaska) assumes responsibility. The crude then is moved by the 600-mile pipe line to the Whitehorse refinery where it is refined. The refined products are dispensed through the gasoline tank farms and pipe lines wholly under direction of U. S. Army authorities.

Orders Awaited for Super Aviation Fuel

LOS ANGELES. — Standard Oil Co. of California is awaiting Army and Navy orders to start producing "X" octane aviation fuel, it was announced last week by Harry D. Collier, president of the company.

Collier pointed out that Standard of California already is making the blending stocks that can go into "X" octane at both its Richmond and El Segundo refineries. These two plants now are producing approximately 30,000 bbl. of 100 octane daily and a new high-octane unit with a capacity of several thousand barrels daily is scheduled to go into production this fall at Richmond.

Collier explained that the higher the quality of fuel, the more of the "cream" of blending stocks is required—"the more quality, the less quantity." However, he said, the new Richmond unit will go far toward permitting his company to maintain its present aviation gasoline production even though the Army and Navy give the "go ahead" on "X" octane output.

Oronite Chemical Plans Phthalic Anhydride Plant

SAN FRANCISCO. — Oronite Chemical Co., subsidiary of Standard Oil Co. of California, last week announced plans for construction of a $1,000,000 plant at Richmond, Calif., for manufacture of phthalic anhydride, basic stock for alkyd resin paints and finishes.

Phthalic anhydride has a variety of other possibilities. Currently, it is being employed as the "starting material" for the manufacture of one of the new-type insect repellents which have been so important in maintaining the health of American fighting men in the South Pacific. Studies are being made to extend its uses to other chemical fields.

The project, which has been approved by the War Production Board, will be the first phthalic anhydride plant west of St. Louis. It will not make finished products, but will act as a wholesale supplier to manufacturers.

Frontier Negotiating for Aviation-Fuel Plant

CHEYENNE, Wyo.—Frontier Refining Co. is negotiating for purchase from the Government of the 100-octane gasoline plant which it is operating here under government sponsorship. The plant, built at a cost of $6,500,000, recently established a record for continuous operations. Officials said it was planned to consolidate the two refineries which Frontier now is operating as a coordinated unit.

Under way is an engineering survey to determine the practicability of converting part of the refineries to black-oil operation, utilizing abundant supplies of newly discovered crude oil from Wyoming's Big Horn basin fields instead of dwindling reserves of green oil. W. R. Newman, vice president in charge of manufacuturing, is making a tour of plants engaged in black-oil refining.

M. H. Robineau, president, said the company will become actively interested in the road oil and asphalt business if it is determined that the conversion is practical. This would mean an expansion of the Cheyenne plants, including a large addition to the storage area.

The big job is producing aviation gasoline. This big Elliott blower is one of the largest in that service. It has a capacity of 50,000 c.f.m. free air, discharging at 15 lb. gage, supplying air for catalyst regeneration in a fluid catalyst cracking process. It is driven by a 3500-hp. multi-valve condensing steam turbine—also Elliott.

When you need a blower unit engineered and built for the job, as this one is, talk it over with us.

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PIPE LINES

Hugoton-California Line Is Considered

Construction of a gas pipe line from fields east of the Rocky Mountains appears to be necessary in order to supply established Pacific Coast markets, because of the impending shortage of natural gas in California. In discussion of plans for a possible line from the Hugoton field of Kansas and Oklahoma, it is reported that Pacific Lighting Corp. has been considering a line of a diameter of 27 or 28 in. which would follow Highway 66.

Construction Progresses On Tennessee Gas Line

All of the sections of the Tennessee Gas & Transmission Co. project of 24-in. natural-gas line contracted by Williams Brothers Corp. were completed last week with the exception of some unfinished work in Texas. The sections completed included those contracted by the firm in Tennessee, Mississippi, Arkansas and Louisiana. The amount of pipe laid by this construction organization, under the direction of Guy S. Connors, for the Tennessee company project now totals more than 400 miles.

During the past week equipment and men have been in the process of being moved from the completed sections to the construction of 30 miles of line in Pennsylvania to be laid for Manufacturers Light & Heat Co. by Williams Brothers Corp. The project will be handled by one spread supervised by Thelma Davis.

Activity Spreading in Texas, Kansas, Oklahoma

In addition to the looping program of Stanolind Pipe Line Co. between Drumright, Okla., and Sycamore, Kans., many other construction projects have been getting under way in an area comprising northern Oklahoma and the Panhandle of Texas, Kansas and Oklahoma, which include the following:

Cities Service Gas Co., 31 miles of 16-in. between Blackwell and Fairfax, Okla., contracted by Oil States Construction Co.

Phillips Petroleum Co., 90 miles of 4-in., 6-in. and 8-in., near Guymon, Okla., contracted by R. H. Fulton & Co.

Natural Gas Pipeline Co. of America, 8,000 ft. of 20-in. pipe for river crossing at Cimarron River, near Forgan, Okla., contracted by C. S. Foreman Co.

Shell Pipe Line Corp., 10 miles of 6-in. to be laid and 16 miles of 6-in. to be taken up in the area between Udall and Rainbow Junction, Kansas, contracted by H. C. Price Co.

U. S. Bureau of Mines, 43 miles of 2-in. i.d. pipe with 2⅜-in. wall thickness for operation with helium at 2,700 lb. pressure near Amarillo, Tex. This is the first contract taken by the newly organized firm of Connors & Fowler.

Pipe Line Program Cost $259,500,000

The Government's oil pipe-line construction and conversion program, including the big-inch crude-oil line from Longview to New York and Philadelphia and the little big-inch products line from the Texas coast to the New York Harbor area, has cost $259,500,000, of which $167,000,000 has been financed by the Government and $92,500,000 by private industry.

A total of 12,381 miles of pipe line is included in the new construction, reversals and conversions program as originally mapped, and a total of 11,703 miles of this had been completed as of August 1.

In announcing details of the completed pipe-line program, the Petroleum Administration for War disclosed that pipe-line movements of crude oil and petroleum products to the East Coast reached an all-time high during the week ended August 5, when an average of 715,222 bbl. of crude and refined products were moved into the East Coast district daily. The previous record flow had been reached in the week that ended July 15, when the daily deliveries amounted to 709,075 bbl.

The record flow consisted of a daily average of 438,286 bbl. of crude oil and 276,936 bbl. of refined products. Practically all the crude and refined products — principally gasoline and heating oils—were produced and refined in Texas.

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Maximum SPEED
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The H & M PIPE CUTTING and BEVELING MACHINE

SPEED: Complete cut and bevel can be made on 12 inch pipe in about 2 minutes.

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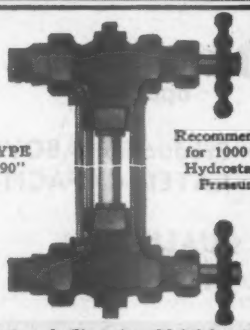

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Recommended for 1000 lb Hydrostatic Pressure

Made of Chromium-Molybdenuin alloy temperature resisting steel, extra heavy throughout and stainless steel trimmed. Positive automatic shut-off; stainless steel balls shut off the flow of liquid if glass breaks. Regrinding removable seats, heavy duty stuffing boxes, union connections. Conform with A.P.I.—A.S.M.E. requirements.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

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DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

Products Pipe Line Operations Increase

Pipe-line transportation of motor fuel in June continued to show increases from both May 1944 and June 1943, Bureau of Mines figures disclose. Meanwhile, movement of motor fuel in pipe lines in the first half of the year registered a considerable gain from the corresponding 1943 period.

Motor fuel turned into pipe lines in the first half of 1944 totaled 128,385,000 bbl., against 89,744,000 bbl. in the corresponding half of 1943, an increase of 43.06 per cent.

Total motor fuel turned into lines in June was 23,662,000 bbl., against 23,079,000 bbl. in May, a gain of 2.53 per cent, and compared with 18,738,000 bbl. in June 1943, an increase of 26.28 per cent.

Motor fuel deliveries from lines in the first 6 months of the year totaled 124,059,000 bbl., against 87,846,000 bbl. in the corresponding 1943 period, a gain of 41.42 per cent. In June the total delivered from lines was 23,782,000 bbl., against 22,929,000 bbl. in May, and 18,773,000 bbl. in June 1943, a gain of 26.68 per cent from a year earlier.

Stocks in lines and working tanks at the end of June totaled 12,265,000 bbl., compared with 12,536,000 bbl. a month earlier, and 7,963,000 bbl. a year earlier.

Bureau of Mines figures indicate that the volume of motor fuel turned into pipe lines was approximately 38 per cent of the total production of motor fuel in June. This is based on a total production of 61,719,000 bbl.

Phillips Building Line From South Tyler Pool

Tyler, Tex. — Phillips Petroleum Co. has started construction of a gathering system and pipe-line outlet for its discovery well, 1 McMinn, in the South Tyler field, 6 miles south of Tyler, Tex.

NEW MAPS
Colorado, Wyoming and Montana

State maps showing oil fields in green, gas fields in red, with index giving official field names and location of fields by township and range.
Shows crude oil pipe lines and natural gas pipe lines with size of lines.
Also shows location of operating refineries with crude oil capacity in barrels per day.
Maps are on a scale 1" = 8 miles and show cities, towns, townships and ranges.
Prices: Blue line on cloth:

Colorado	Size 42"x50"	$15.00
Wyoming	Size 42"x50"	$17.50
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in any Weather!

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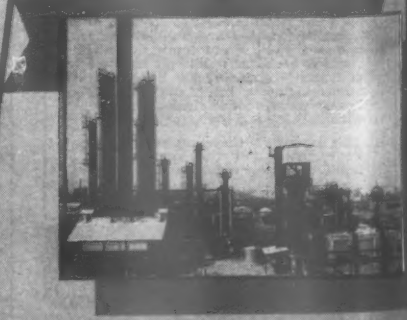

Here's another fine record for continuous operation!

Mr. H. W. Camp, manager of the Refining Division of Cities Service Oil Company, writes us of these CLARK'S in their East Chicago refinery: "These compressors are a vital part of the alkylation unit, and both compressors must be in operation continuously, to maintain the maximum rate of alkylate production. The combined alkylation and isomerization unit at East Chicago has, from reports received, one of the finest records in the industry for continuity of operation, rate of production above design figures, and quality of production."

Consult with CLARK on your compressor problems.

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Natural Gas

Export of Natural Gas to Mexico May be Increased

WASHINGTON. — An application has been filed with Federal Power Commission by United Gas Corp. asking for renewal of authorization to export natural gas from Texas fields to Mexico for distribution in the city of Nuevo Laredo. The company proposes to replace with a 6-in. pipe line part of its 4-in. line extending from Laredo, Tex., to the international boundary. FPC set September 1 for a hearing on the application.

The applicant asserts that widened facilities are required to provide for delivery of increased quantities of gas to existing customers and proposed new customers of Compania de Gas de Nuevo Laredo, S.A., in Mexico.

United Gas Corp. has executed a new gas sales contract with Compania de Gas de Nuevo Laredo, S.A., to supersede its present one. By an order dated September 10, 1940, FPC authorized the applicant's exportation of natural gas from the United States to Nuevo Laredo, Mexico, in accordance with the terms of the present contract. This authorization is to terminate automatically upon expiration of the contract, but is subject to renewal if the commission finds it is not inconsistent with the public interest.

Advisory Group Named for Fuel Efficiency Program

OKLAHOMA CITY.—An advisory committee in the campaign to save fuel and energy was appointed last week by Guy B. Treat, recently named coordinator for the national fuel-efficiency program in the Oklahoma City area by the U. S. Bureau of Mines.

Members of the committee are M. E. Orelup and G. T. Donceel, industrial engineers, Oklahoma Natural Gas Co.; Cecil C. Willis, superintendent of generation, and W. H. Steuve, chief power consultant, Oklahoma Gas & Electric Co.; Gwynne Raymond, chief engineer, Black, Sivalls & Bryson, Inc.; Louis Loeffler, Jr., vice president, Federal Supply Co.

This committee, Treat said, is part of a nation-wide group of engineers who are serving without compensation to help the National Fuel Efficiency Council and the Bureau of Mines achieve their campaign goal—a 29,000,000-ton reduction in the nation's annual commercial and industrial consumption of coal and proportionate savings in other fuels.

Receivership for Bammel Gas Field Suggested

AUSTIN.—Suggestion that problems presented by the Bammel gas field, in Harris County, Texas, be solved by appointment of a receiver was made by Sen. Weaver Moore, of Houston, representing mineral owners, at a hearing held last week by the state Railroad Commission on matters relating to that field.

A representative of F. M. Corzelius, owner of the well which blew out and caught fire more than a year ago, said that more water should be pumped into the hole through the directional well drilled from H. M. Harrell's adjacent lease. The well, once under control, recently has been blowing gas again, it was reported. The commission will hold another hearing.

Operators in East Urged to Unitize and Repressure

PITTSBURGH. — Utilization of natural gas for repressuring purposes was urged at a meeting here of the Southwest Pennsylvania production committee of Pennsylvania Grade Crude Oil Association. This, with unitization of pools, might increase crude output 25 per cent in this area, members of the committee said. A few unitized projects are operating, but the need for widespread consolidation was emphasized.

"Old Faithful," Lone Star's Patriarch, Makes Adieu

DALLAS.—"Old Faithful," oldest producing gas well in the history of Lone Star Gas Co., is retiring, along with 12 other wells in the Petrolia field of Clay County, after almost 35 years of operation. Appearing on the company's records as 1 Miller, "Old Faithful" was one of the first seven wells drilled in the now almost extinct field in 1909, when Lone Star received a charter to pipe natural gas from Petrolia to Fort Worth and Dallas.

The well, brought in November 14, 1909, was drilled originally to a depth of 1,544 ft. and it never was found necessary to deepen it.

The entire Petrolia field in which there are only 24 wells now in operation with 13 of these to be abandoned immediately, produced a total of 93,133,000,000 cu. ft. to January 1, 1944. No wells have been drilled at Petrolia since 1932.

College Receives Help for Spectrometer Development

COLLEGE STATION, Tex.—A research fellowship of $7,500 for further development of the Westinghouse mass spectrometer has been received by Texas A. and M. College, according to Dr. Howard W. Barlow, acting dean of engineering.

Natural Gasoline

L.P.G. Operators Granted Use of MRO Materials

WASHINGTON.—Distributors and marketers of liquefied petroleum gas now may use materials for the maintenance and repair or construction of structures required in the operation of these businesses by obtaining authorization under limitation Order L-86, which is administered by the Petroleum Administration for War.

Action was taken by the War Production Board which, upon the recommendation of PAW, amended Limitation Order L-86 and Limitation Order L-41.

Under the amendment to Limitation Order L-86, distributors and marketers of liquefied petroleum gas may now obtain materials for the maintenance and repair of structures required in these businesses by using the automatic preference ratings provided in Preference Rating Order P-98-b.

Under the terms of the amendment to L-86, liquefied petroleum gas distributors and marketers who wish to build new structures must apply to the PAW for permission to use materials for this purpose by filing a PAW Form 30. Form 30 should be addressed to the Natural Gas and Natural Gasoline Division, Ref: L-86, Petroleum Administration for War, Interior Building, Washington 25, D. C.

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Exploration and Drilling

Week's Highlights

Mississippi again claims the attention of oil men by giving new evidence of its future oil producing potentialities. The California Co. 1 W. C. Douglas, NE SE 10-6n-8e, about 5 miles southeast of the town of Brookhaven, in Lincoln County, was washed in this week and started flowing about 400 bbl. per day of 39.2°-gravity oil.

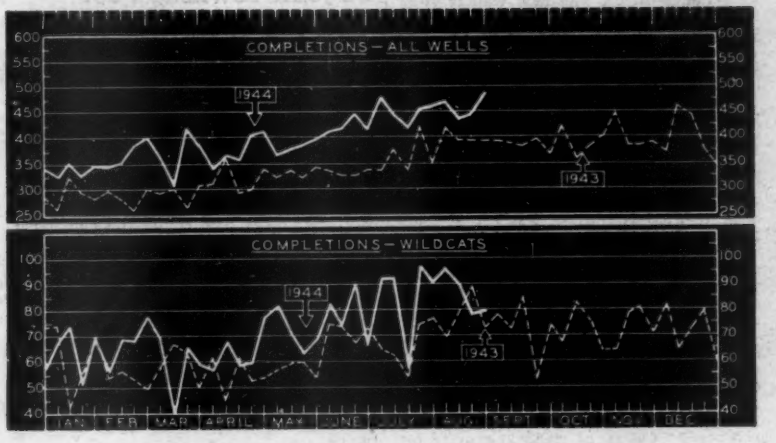
This new discovery, in the southern part of the state, is about 80 miles west and 25 miles south of the Heidelberg pool, and 50 miles east and a little south of the Cranfield pool, while the Tinsley field lies about 80 miles north. The new well is about 10 miles southeast of the Brookhaven pool, opened by the same company in 1943.

The Douglas wildcat is producing from sand in the Massive Tuscaloosa formation. Surface elevation is 457 ft., and top of the Massive has been reported at 10,515 ft. A string of 7-in. casing was set at 10,642 ft., perforated with 240 shots between 10,514-48 ft., and the late reports indicate a flow of 15 to 18 bbl. per hour through a 3/16-in. tubing choke. Tubing pressure is reported at 1,800 lb.

Regionally, the new pool lies in the structural basin west of the McHenry High and south of the Jackson uplift. This basin has been highly favored by the geological fraternity and a substantial amount of exploratory activity has been going on for some time. The new strike can be expected to intensify this work if manpower and geophysical equipment is available.

The map readers and geographical trend players will immediately notice that the new Douglas well fits in very nicely with a west to east trend across the southern part of the state, starting with Cranfield, thence to the new well, thence to S. W. Richardson's recent condensate discovery in 24-9n-19w, Jeff Davis County, thence to Eucutta, and even on east across the state line to the Gilbertown pool in Alabama.

Refiners and pipe-line men will be interested in the high gravity, reported at 39.2°, compared to the low gravity, heavy oil being produced at Heidelberg and Eucutta.



Solid line charts current weekly completions

COMPLETIONS IN ALL FIELDS . . .

Week ended August 26, 1944

	Oil	Gas	Dry	Total	Footage	Total Comp. to date 1944	1943
N. Y., Penna., W. Va.*	54	12	4	70	170,722	2,146	2,214
Ohio	4	10	6	20	63,142	623	567
Indiana	4	0	5	9	20,226	149	147
Kentucky	10	2	4	16	30,144	449	256
Illinois	23	0	11	34	94,436	1,186	1,130
Michigan	4	3	6	13	29,331	406	369
Kansas	24	0	29	53	184,541	1,164	1,054
Nebraska, Missouri, Iowa	0	0	1	1	1,453	22	30
Oklahoma	20	4	13	37	148,985	1,101	759
Texas:							
North Central	27	0	29	56	181,225	957	901
West	30	1	6	37	179,423	979	546
Panhandle	7	2	1	10	35,100	152	119
Eastern	2	0	1	3	21,247	209	186
Gulf Coast	21	2	6	29	192,859	774	288
Southwest	7	0	6	13	49,018	469	580
Total Texas	94	5	49	148	658,872	3,540	2,620
Louisiana:							
Northern	1	4	5	10	32,007	197	208
Southern	7	0	0	7	63,245	312	240
Total Louisiana	8	4	5	17	95,252	509	446
Arkansas	0	0	5	5	24,679	146	161
Mississippi	2	0	0	2	10,248	86	58
Southeastern States	0	0	1	1	4,744	24	†
Montana	9	0	5	14	31,000	217	139
Wyoming	5	0	0	5	17,334	108	86
Utah	0	0	1	1	4,744	21	18
New Mexico	3	0	6	9	32,591	251	144
California	29	0	5	34	114,734	1,277	856
Total United States	293	40	156	489	1,737,178	13,425	11,054
Total previous week	259	45	142	446			
Total Aug. 28, 1943	194	39	146	379			

*Does not include 53 pressure wells. †Included in total shown for Mississippi.

CALIFORNIA

Miocene Discovery Expected at Gosford

LOS ANGELES.—Tide Water Associated Oil Co. recently completed a semi-wildcat in the Gosford district of Kern County, importance of which is obscured by its proximty to Ten Section and Canfield Ranch fields. The new well is 44-22 Kern County Land in 22-30s-26e. Oil sand was cored between the shoe of the 5½-in. at 8,060 ft. and total depth at 8,152 ft. Development may prove that Tide Water has discovered a new pool in the Miocene.

Standard Oil Co. of California appears to be on the verge of discovering a new dry gas pool in the Alpaugh district of Kings County approximately 8 miles northwest of the Delano-Trico gas field. Standard 1 Cutter Unit, 29-23s-22e, was drilled to 3,575 ft. and was then plugged back to 3,555 ft. Casing was set at 3,480 ft. On a formation test at 3,425-565 ft. the recovery was salt water and 9,000,000 cu. ft. of gas. Production tests on the Alpaugh wildcat continue but on the basis of showings to date a new gas field appears certain.

Superior Oil Co. of California may have discovered a new pool about 5 miles northwest of the Helm field in Fresno County based on results of a formation test. Superior 68-30 Brackney, in 30-15s-17e, on a formation test at 6,993-7,010 ft. recovered 1,050 ft. of clean 27-gravity oil and 150 ft. of mud. With a 1,000-ft. water cushion, gas reached the surface in 10 minutes with the tester open for 12 minutes. Top of the Kreyenhagen was placed at 6,609 ft. and base of the Domengine at 7,019 ft.

Standard of California is less than 200 ft. shy of California's deep drilling record of 15,004 ft., as the company's 20-13 Kern County Land at Coles Levee, 5-31s-25e, drilled ahead below 14,830 ft.

CALIFORNIA WILDCAT COMPLETIONS

Davidson City, Los Angeles County: General Exploration Co., 2 Dominguez, 11-4s-13w, dry in gray sand, TD 7,780 ft.

Salton Sea district, Imperial County: O'Quinn & Hadley 1 All American Acres, 11-9s-12e, dry in alluvial silt, TD 1,415 ft.

Round Mountain, Kern County: U. S. Drilling Co. 3 S. P., 23-28s-28e, Vedder 2,668 ft., dry, TD 2,713 ft.

KANSAS

St. John Townsite Pool Gets Big Well

IN a week of heavy completions by Kansas operators, Stanolind Oil & Gas Co. 3 Delker, SE SW NE 33-23s-13w, St. John Townsite pool in Stafford County, was completed for a potential rating of 6,297 bbl. from Arbuckle pay zone at 2,920-55 ft.

There were 53 completions during the week, of which 24 were oil wells and 29 were dry holes. The completions included 18 wildcats, all but one of which were dry. New operations announced totaled 45, of which 11 were wildcat starts.

Barton County.—In the Boyd pool, Continental Oil Co. and Phillips Petroleum Co. 2 Monroe, SE SW SE 4-18-14w, was completed in the Arbuckle at 3,440-56 ft. for a potential of 1,214 bbl.

Pratt County.—In the Chitwood pool, Sinclair Prairie Oil Co. 1 Blurton, NE SE NW 22-28-12w, drew a potential rating of 1,862 bbl. from Simpson pay at 4,405-36 ft.

Rooks County.—In the Paleo pool, Continental 1 Hall, NE NW NW 4-10-20w, had a potential rating of 1,439 bbl. from Arbuckle pay at 3,829-33 ft.

Russell County.—In the Big Creek pool, Palmer Oil Co. 7 Neidenthal, NW NE SE 23-14-14w, rated a potential of 4,778 bbl. from Arbuckle pay at 3,167-69 ft.

KANSAS WILDCAT COMPLETIONS

Barton County: Western Petroleum Exploration 1 Schnewiss, NW NW SW 33-16s-12w, dry, TD 3,400 ft., cherty conglomerate 3,360 ft., Arbuckle 3,368 ft.

Butler County: Adair & Morton 1 Ellis, NE NE NE 34-28s-7e, dry, TD 3,270 ft., Mississippi lime 2,835 ft., Arbuckle 3,265 ft.

Dickinson County: Phillips 1 Dickinson, NW NW SE 26-11s-1e, dry, TD 3,364 ft., Arbuckle 3,230 ft.

Geary County: Transcontinental 1 Acker, N/2 NE NE 1-12s-4e, dry, TD 2,830 ft., Sylvan 2,650 ft., Viola 2,705 ft.

Graham County: Phillips 1 Sandzen, SW SW SE 14-9s-22w, dry, TD 3,970 ft., Arbuckle 3,955 ft.

Kiowa County: Vierson & Cochran 1 Butler, NE NE NW 22-27s-19w, dry, TD 5,060 ft., Kansas City 4,176 ft., Mississippi 4,773 ft., Kinderhook 4,929 ft., Viola 4,990 ft.

McPherson County: Phillips 1 Vogts, NE NE NE 4-20s-1w, dry, TD 3,572 ft., Simpson 3,465 ft., Arbuckle 3,543 ft.

Ness County: Sinclair Prairie 1 Elmore, NW NE SW 26-17s-22w, dry, TD 4,700 ft., Viola 4,412 ft., Fort Scott 4,170 ft., Arbuckle 4,582 ft.

Norton County: Allen & Aylward 1 Lecky, SE SE NW 29-2s-23w, dry, TD 3,692 ft., Clovis 3,637, granite wash 3,644 ft.

Pratt County: Texas 1 Toland, NE SE 12-26s-14w, dry, TD 4,492 ft., Kinderhook 4,302 ft., Viola 4,348 ft., Simpson 4,400 ft., Arbuckle 4,474 ft.

Texas 1 Toland, NE NE SW 7-26s-13w, dry, TD 4,496 ft., Simpson 4,376 ft., Arbuckle 4,446 ft.

Reno County: Phillips 1 Trembly, SW SW NE 32-25s-8w, dry, TD 4,340 ft., Simpson 4,217 ft., Arbuckle 4,310 ft.

Sedgwick County: Beech Aircraft 1 Morrison, SE SW SE 20-28s-2e, dry, TD 3,094 ft., Stalnaker 2,040 ft., Lansing 2,183 ft., Kansas City 2,525 ft.

Stafford County: N. Appleman 1 Russell, SW SW SW 24-25s-13w, dry, TD 4,288 ft., Simpson 4,209 ft., Arbuckle 4,279 ft.

W. P. Faulkner 1 Cadman, discovery, SE SE NW 4-25s-13w, pumped 25 bbl. per day, pay zone 4,068-75 ft., TD 4,090 ft., Kinderhook 3,652 ft., Clovis 4,018 ft., Crystalline Viola 4,045-66 ft.

Lion Oil 1 Lincoln, SW SW SE 29-21s-14w, dry, TD 3,920 ft., Simpson sand 3,827 ft., Arbuckle 3,863 ft.

Trego County: Phillips 1 Folkers, SW SW SW 31-13s-23w, dry, TD 4,602 ft., Viola 4,453 ft., Simpson 4,540 ft., Arbuckle 4,545 ft.

Phillips 1 Eunice, SW SW SE 21-11s-22w, dry, TD 4,078 ft., Arbuckle 4,045 ft.

DAILY AVERAGE PRODUCTION FOR WEEK

	Aug. 26 crude oil	Distillate, allied products	September PAW quota all oils	Aug. 19 crude oil
Arkansas	80,900	4,500	82,900	80,600
California	865,450	51,100	936,700	860,400
Colorado	8,500	.....	8,000	8,100
Eastern	70,200	6,100	71,300	77,500
Illinois	205,300	11,500	222,000	208,700
Indiana	13,050	.....	14,000	12,800
Kansas	278,900	4,300	279,700	285,300
Kentucky	24,250	2,500	27,700	24,600
Louisiana	362,500	35,000	385,000	362,700
North Louisiana	73,500	.....	.....	73,750
South Louisiana	289,000	.....	.....	288,950
Michigan	50,600	400	51,500	49,400
Mississippi	48,750	.....	45,000	45,750
Montana	20,800	200	24,300	23,100
Nebraska	500	.....	1,000	500
New Mexico	106,100	5,500	115,500	105,800
Oklahoma	342,000	27,000	370,800	340,000
Texas	2,108,450	138,000	2,303,000	2,108,600
East Texas	371,900	.....	.....	371,700
East Central Texas	147,500	.....	.....	147,650
North Central Texas	148,500	.....	.....	148,750
Texas Panhandle	98,800	.....	.....	98,700
West Texas	485,000	.....	.....	484,950
South Central (San Antonio)	19,250	.....	.....	19,300
South Texas (Laredo)	77,400	.....	.....	77,400
Lower Gulf Coast	224,900	.....	.....	224,950
Upper Gulf Coast	535,200	.....	.....	535,200
Wyoming	86,800	3,000	103,200	84,200
Total United States	4,673,050	289,100	5,051,300	4,678,450

Total production January 1-August 26, 1944 ..... 1,073,453,950 bbl.
Same period last year ..... 946,271,600 bbl.

MICHIGAN

Deep River Producer Flows 2,136 Bbl. Daily

SAGINAW.—While the state conservation department issued 23 new drilling permits last week, operators reported 13 completions in Michigan, including four oil wells, three gas producers and six dry holes, three being wildcat tests. Two of the gas wells, in Goodwell field of Newaygo County, rated better than 10,000,000 cu. ft. per day. The completions list included the M. E. Holloway 1 Kocot in Section 16 of Deep River Township, Arenac County, where the flow was at a daily rate of 2,136 bbl. through ¾-in. choke after acid treatment. The well was completed at 2,790 ft.

MICHIGAN WILDCAT COMPLETIONS

Allegan County, Door Township: Carl E. Grimes 1 Ambroski, SE SE SE 32-4n-12w, dry in Traverse, TD 1,610 ft.

Kent County, Byron Township: Clifford A. Perry 1 Anthony Zerfas, SE SE SE 32-5n-12w, dry in Traverse, TD 1,788 ft.

Van Buren County, Columbia Township: W. H. Clock 1 Walter Casper, SW SW NW 20-1s-15w, dry in Traverse, TD 1,133 ft.

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PERMIAN BASIN

Ector Discovery Is In Basal Permian or Devonian

MIDLAND. — Shell Oil Co., Inc., and Cities Service Oil Co. 1 TXL, deep wildcat in northwestern Ector County, on the basis of unconfirmed but reliable reports has discovered an important new basal Permian or Devonian lime-producing area. The well is credited with showing 1,000,000 cu. ft. of gas in 7 minutes while making a 40-minute drill-stem test at 7,830-7,936 ft., and then flowed oil after 35 minutes at the estimated rate of 60 bbl. per hour. Hole was deepened to 7,956 ft. where operators attempted to make another drill-stem test. Located in Section 7, Block 45, T-1-S, T&PRR Survey, the well is 5 miles northeast of the Wheeler-Ellenburger field, and 5 miles west of the Goldsmith pool. The depth at which it is testing corresponds with the depth at which the Devonian formation is encountered in the Wheeler-Ellenburger pool.

This Ector County strike follows close on the heels of the completion by Mid-Continent Petroleum Corp. of its Devonian lime discovery, 1-7 University, for potential of 3,744 bbl. of 40-gravity oil per day from casing perforations at 8,460 to 8,600 ft., after acidizing with 1,000 gal. It is in Section 20, Block 13, University Lands, Andrews County, approximately 36 miles almost due north of the new Ector County well. Mid-Continent has staked location for 1-11 University, in Section 29, 1,850 ft. southwest of the 1-7 University producer, as a 9,000-ft. test. Another Andrews County wildcat, Champlin Refining Co. 1-B University, Section 5, Block 11, University Lands, 5 miles northwest of the Embar pool, indicated possible lower Permian production when it recovered 180 ft. of drilling water heavily cut with live oil on a 35-minute drill-stem test at 7,135 to 7,262 ft. It was drilling ahead, with a 7,500-ft. contract.

Sixty new locations were announced in the West Texas district last week as the area's drilling program continued to expand. In addition to a number of locations which are important outposts to producing fields, an impressive list of rank wildcats was included.

WEST TEXAS WILDCAT COMPLETIONS

Andrews County: Phillips Petroleum Co. 1-H Texas University, Sec. 37, Blk. 9, University, elev. 3,126 ft., anhydrite 1,850 ft., Yates 3,100 ft., pumping 120 bbl. day, TD 4,917 ft.

Cochran County: L. A. Douglas 1 R. E. Sherrill, Sec. 10, Blk. W, PSL, 1 mi. E New Mexico and Texas state line, elev. 3,928 ft., anhydrite 2,300 ft., Yates 2,950 ft., San Andres 4,210 ft., dry, TD 5,200 ft.

Tom Green County: L. L. Ingrahan 1 M. B. Pulliam Est., C SE NW Sec. 12, Blk. 4, H&TC Sur., elev. 2,070 ft., dry, TD 1,750 ft.

Winkler County: De Kalb Agricultural Assoc. 1 M. H. Mitchell, Sec. 23, Blk. 10, PSL, elev. 2,802 ft., anhydrite 955 ft., B.S. 2,400 ft., dry, temporarily abandoned, TD 6,500 ft.

PANHANDLE WILDCAT COMPLETIONS

Dallam County: Pure Oil Co. 1 Sneed Est., Sec. 13, Blk. 18, Capital Syndicate, 28 mi. N Dalhart, elev. 4,013 ft., Mississippian 5,331 ft., Ellenburger 6,182 ft., dry, TD 6,779 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Fred Turner, Jr., 1-C State, ½ mile north of his discovery well in the new pool 3 miles west of South Lovington, flowed 90 bbl. of oil in 12 hours through ¼-in. tubing choke from pay at 4,720 to 5,183 ft., total depth.

SOUTHEAST NEW MEXICO WILDCAT COMPLETIONS

Lea County: De Klab Agricultural Assoc. 1 Raley heirs, C NW NW 16-20s-38e, anhydrite 1,560 ft., B.S. 2,670 ft., Yates 2,840 ft., show oil and gas 3,072 ft., dry, TD 3,315 ft.

EASTERN TEXAS

Smackover Discovery Offset to Explore Scope

DALLAS.—Locations have been staked for a 10,900-ft. wildcat in Van Zandt County and for a 1,000-ft. west outpost to the new Smackover lime discovery in Bowie County. Magnolia Petroleum Co. spotted 1 J. H. Phillips in the Fruitvale community of Van Zandt County, 900 ft. from southwest and 3,100 ft. from northwest lines of the E. Van Sickle Survey, to be drilled to 10,000 ft. In Bowie County, Barnsdall Oil Co. and Sohio Petroleum Corp. 1 Gifford Hill was staked approximately 1,000 ft. west of their 2 Heilbron, 7,716-ft. Smackover producer.

Red River County. — Oscar Donnelly, trustee, 1 Ross Mitchell, 2 miles south of Allen Mills, ran electrical log then cemented 5½-in. casing at 2,161 ft. with the intention of perforating to test a zone which had shows of oil and gas at 1,840-50 ft.

Panola County.—Skelly Oil Co. 1 Houston Mills, wildcat in the M. A. Romero Survey, 12 miles west of Carthage, cored lime with medium to slight porosity with odor of gas and distillate from 6,352-72 ft. and was going ahead. It showed considerable gas in the upper Pettit at 6,160 to 6,200 ft. In the Carthage gas field, Union Producing Co. 1 Chadwick

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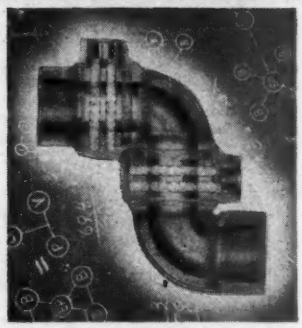

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unit rated 31,462,000 cu. ft. of gas open flow from lower Pettit at 5,920-50 and 6,050-70 ft., with 28 bbl. of distillate per 1,000,000 cu. ft. of gas, and 91,942,000 cu. ft., with 25 bbl. distillate per 1,000,000 from the upper Pettit at 5,768-5,808 ft., on a dual completion.

N. CENTRAL TEXAS

Cooke Pool Discovery Completed for 161 Bbl.

WICHITA FALLS.—The recent shallow Cooke County discovery at Paul B. Scott 1 Walterscheid, E. Langford Survey, 8 miles southwest of Muenster, was completed last week pumping 161 bbl. daily of 40-gravity oil from sand at 2,600-10 ft. The Texas Co. 1 W. B. Rasure, wildcat, was drilling below 6,275 ft. in shale.

Wilbarger and Jack counties each received a 6,000-ft. wildcat test last week. In the former county, Big Six Oil Co. 1-A Schloffke-Morris was staked 760 ft. from south, 737 ft. from east lines of Section 3, Block 14, H&TCRR Survey, 2 miles west of Harrold, while in Jack County, Hanlon-Buchanan, Inc. 1 C. M. Matlock was spotted in the southwest corner of the southwest 50-acre tract in the A. H. Latimer Survey A-363, 5 miles southwest of Jacksboro.

NORTH TEXAS WILDCAT COMPLETIONS

Archer County: Cochran & Cain 1 J. L. Anderson, Blk. 19, South Anderson Ranch subdivision, 4 mi. E and 1 mi. N Megargel, elev. 1,242 ft., sand show oil 1,367-69 ft., dry, TD 1,369 ft.

King & Petre 1 Joseph Levy, C. K. Simmons Sur. A-391, 3 mi. S and 2 mi. E Archer City, dry, TD 1,850 ft.

Phillips Petroleum Co. 1 T. F. Wilson "Tribune," Sec. 109, ATNCL Sur., 5 mi. N and 1 mi. W Archer City, elev. 997 ft., Caddo 4,882 ft., lime show oil 4,895-4,940 ft., flowed 646 bbl. day, TP 600-220 lb., gravity 42.1°, TD 4,975 ft.

Clay County: W. J. Price 1 Beatrice Bevering, BBB&C Sur. A-367, 1 mi. S and 1½ mi. E Charlie, elev. 933 ft., dry, TD 450 ft.

W. H. Spradling 2 C. T. Taylor, Lot 38, Bacon Subdivision, 3 mi. W Petrolia, dry, TD 1,150 ft.

Cooke County: G. E. Kadane & Sons 1 G. C. Cartwright, B. J. Thompson Sur. A-1,006, 2 mi. W and 5 mi. S Lindsay, elev. 922 ft., dry, TD 2,170 ft.

Sinclair Prairie Oil Co. 1 Wm. Kitchens, Lot 9, Fannin CSL, 1 mi. E Callisburg, elev. 804 ft., Winger 5,436 ft., Ellenburger 6,468 ft., dry, TD 6,525 ft.

King County: Gulf Oil Corp. 1 R. B. Masterson Est., Sec. 1, E. L. Ribble Sur. A-1,207, 13 mi. N and 10 mi. E Guthrie, Mississippian 6,297 ft., Ellenburger 6,589 ft., dry, TD 6,650 ft.

Montague County: Grady T. Chupp 1 L. D. Childress, R. H. Grimes Sur. A-288, 5 mi. N and 1½ mi. E St. Jo, elev. 874 ft., pumping 4 bbl. day, TD 2,436 ft.

WEST CENTRAL TEXAS

ABILENE.—Completion of a Mississippian lime discovery in Stephens County and discovery of a new Flippen lime pool in Jones County topped West Central Texas developments during the week.

In Jones County, 6 miles southwest of Anson, Merry Brothers and Perini and Alder Oil Co. 1 Heddon, topped Flippen lime at 2,382 ft., drilled soft lime pay from 2,384-88 ft., total depth, where it headed over the mast, flowing for 6 hours before being killed. Operators ce-

(Continued on page 92)

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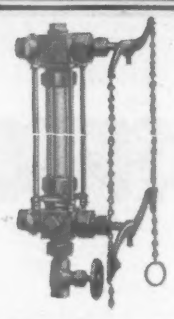

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WHEELING, WEST VA.

APPALACHIAN FIELD

New West Virginia Gas Area Extended

PITTSBURGH.—In Flemington district, Taylor County, West Virginia, Pittsburgh and West Virginia Gas Co. completed a second test on U. S. Morrow as a large Big Injun sand gas well gaging 4,427,000 cu. ft. at total depth of 1,248½ ft. In Hancock County, John T. Galey et al topped the Oriskany sand at 4,604 ft. in the test on Tomlinson Run Park (H. Balser) in the Clay district and at 4,616 ft. tools stuck.

In Preston County, the important wildcat of William E. Snee et al on the Harry Sisler farm on Briery Mountain anticline, is drilling at 4,723 ft. with a shaley lime appearing at 4,630 ft. which is possibly the Tully lime. If this is confirmed, the test will be 100 ft. or more higher than an earlier well which failed to reach the Oriskany due to a crooked hole.

In Logan County, South Penn Natural Gas Co. wildcat on Buffalo Creek Coal & Coke Co., appears certain of successful completion and opens an extensive area. Here, the Big lime was logged at 2,413 to 2,715 ft. with 55,000 cu. ft. gas at 2,649 ft., Injun 2,715-50 ft. with 321,000 cu. ft. gas at 2,952-61 ft. and 2,970-75 ft., Berea 3,228-66 ft. and brown shale at 2,935-3,085 ft. with gas from shells gaging 189,000 cu. ft. Total depth is 3,369 ft. and the test will be acidized.

ROCKY MOUNTAIN

Tensleep Proven at Spindletop, Wyoming

DENVER.—The Spindletop field, Natrona County, Wyoming, 35 miles southwest of Casper, had a discovery in the Tensleep in Wyalta Oil Co. 1-D Government, SE SE SW 32-30n-81w, at 2,445 ft., total depth. Top of the Tensleep was at 2,224 ft., and the 5½-in. pipe was set at 2,385 ft., and perforated with 28 holes at 2,250-68 ft. The well swabbed 640 bbl. in 48 hours, the oil being very heavy and approximately 16° gravity. It is estimated at 600 bbl. on the pump. The field was discovered in 1922 and has had some production from the Sundance sand at around 1,000 ft. Four wells in the Sundance produced around 60 bbl. per day.

Pennsylvania missing at Cisco.—The Cisco structure, eastern Utah, which produced gas from the Dakota at around 2,000 ft., for a number of years, failed to live up to its promise in lower horizons. Continental Oil Co. and Union Oil Co. of California in 1 Cisco Unit, SE SE NE 23-20s-21e, went directly from the Moenkopi of Triassic age, topped at 4,000 ft., into arkose, and after drilling several hundred feet of granite, it was abandoned at 4,744 ft.

Garland test at critical stage.—General Petroleum Corp. 1 Williams, Lot 51-56n-97w, Garland structure, Big Horn County, Wyoming, an important Tensleep test on the east side of the axis, although running structurally low, gives promise of making a producer in the Embar and causing a revision of former data on the area. It had the top of the Embar at 4,481 ft. and was still in that horizon at 4,681 ft., and showing saturation. The beds are dipping at approximately 60° and the Tensleep has not yet been reached. The well is a mile northeast of and across the top of the structure from the same company's 1 Nauser, which had water in the Tensleep. The Williams well, although

(Continued on page 92)

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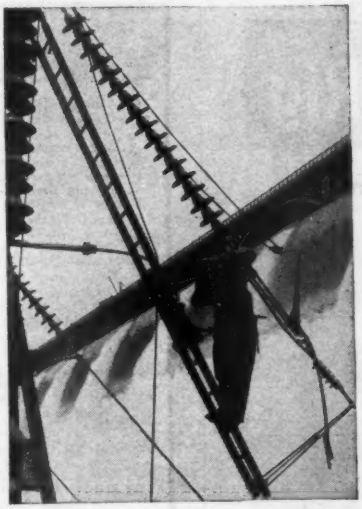

Pictured above is a lineman Ned Ingalls who, with the aid of a Coffing "Safety-Pull" hoist, is man-handling a soon-to-be "hot" wire, as he imitates the "man on the flying trapeze" from his dizzy perch at Grand Coulee Dam.

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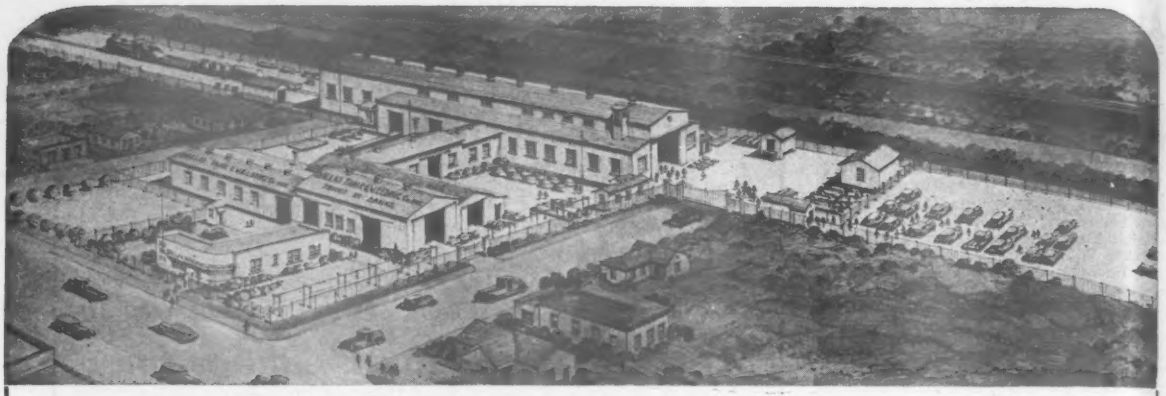

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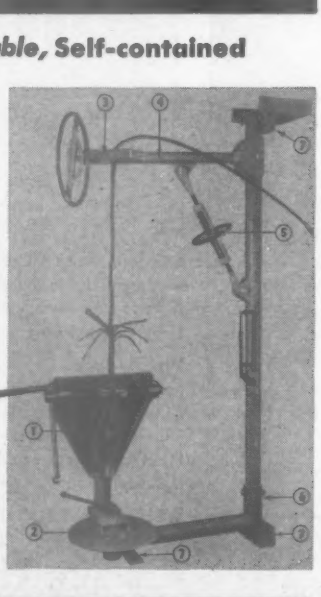

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SOUTHWEST TEXAS

Agua Dulce Sand Gains First Oil Producer

CORPUS CHRISTI.—Ginther, Warren & Ginther of Houston have reported potential on 2 Mrs. Lena Grebe, F. Z. Bishop Subdivision of Palo Alto Grant, Agua Dulce area of Nueces County. This well opens first oil production in this sand. Drilled to total depth of 6,832 ft., with 5½-in. casing set on bottom, pipe was perforated with 24 shots from 6,806-18 ft. in sand topped at 6,804 ft. the well flowed potential of 152.88 bbl. daily through 3/16-in. choke, gas-oil ratio 1,100:1. Tubing pressure was 650 lb., casing pressure 1,225 lb., gravity 40°, no water.

George W. Strake is preparing to run potential at 1 A. F. Dahl at South Caesar field in Bee County. Total depth is 6,510 ft. with 5½-in. casing at 6,510 ft., perforated at bottom. Production is about 60 to 65 bbl. per day. Operator has applied for permit to drill a southwest offset on the south edge of production.

H. R. Smith and W. C. McBride 2 W. H. Rivers Estate, northwest of discovery well of the Brayton pool, Nueces County, is completed for 30,000,000 cu. ft. of gas per day on open flow with estimated 20 bbl. of condensate per 1,000,000 ft. of gas. It flows from perforations at 6,592-6,638 ft. Total depth 7,880 ft. in a sand higher than that from which the discovery well is producing 40-gravity oil.

Oil production from a sand at 6,282 ft. is indicated at Stanolind Oil & Gas Co. 2 George R. Clark, about a mile northeast of the company's 4,800-ft. sand gas well in Riverside area of Nueces County. The 2 Clark has total depth 6,561 ft. with 5½-in. casing set at 6,430 ft., perforated 6,282-83 ft., ran 10-hour drill-stem test, using ¼-in. bottom and ⅛-in. top chokes, flowed 45 bbl. 49.6-gravity oil in 5½ hours.

M. H. Marrs and Herman Brown (Anderson-Prichard) 1 Tenberg, wildcat in the Burnell area, Karnes County, ran drill-stem test from 6,940-50 ft. and recovered 810 ft. salt water, 500 ft. of mud in 20 minutes. Total depth is 6,950 ft. Hole will be plugged back and upper sand tested. The test is reported to have cored hard sand and shale from 6,703-32 ft. with sand carrying oil show from 6,732-33 ft.

Charles E. Fraser, Inc. 2-A A. M. Bruni Estate, 660 ft. east of 1 Bruni and in C&M Survey 447, Bruni area of Webb County, is reported showing favorably and may make better than 100 bbl. per day. Total depth is 1,810 ft. in sand topped at 1,800 ft.

Humble Oil & Refining Co. 2 Joseph F. Green Estate, ½ mile northeast of the Gregory field discovery well, San Patricio, is running tubing for a new production test in 15 perforations, from 8,503-05 ft. On previous test at this level it had flowed 39 bbl. fluid per hour on 3/16-in. choke but showed about 16 per cent salt water, gas-oil ratio 1,370 to 1. Water was believed coming in from below so squeeze job was made. Total depth is 9,502 ft. with 5½-in. pipe set at 8,595 ft.

SOUTHWEST TEXAS WILDCAT COMPLETIONS

Atascosa County: Hurlbut, S. F., 1-A Countiss, Austin & Williams Survey, about 1½ mi. E of Hinds townsite, dry at 5,383 ft.

Bee County: Navarro Oil Co. 1 E. J. Spielhagen, John Pace Survey, 2 mi. NW of Pettus, total depth 7,432 ft., perforated 140 holes 7,334-38 ft., PT cleaned on ¼-in. choke, dry gas, shut in, no gage, shut-in tubing pressure 2,400 lb., casing pressure 2,450 lb.

Duval County: Argo Oil Corp. 1 Mrs. Clara Driscoll, J. A. de los Santos Survey 8, 8 mi. NW of Benavides, dry at 4,536 ft.

J. W. Gorman 4 A. Herbst, SA&MB Sur. 9½ mi. E. of Freer, dry at 2,830 ft.

Jim Wells County: Smith & Mosser and H. B. Zachry Co. 1 R. V. Embleton, Los Presenos de Arriba Grant, dry at 5,412 ft.

Karnes County: Al Buchanan and Slick Oil Co. 1 Mary K. Wolfe et al, LPIA&M Sur., 4 mi. W of Green, dry at 6,295 ft.

Nueces County: Hewitt & Dougherty 1 J. R. Dougherty, "Casa Blanca" Juan Jose de la Garza, Montemayor Sur., 8 mi. E of Orange Grove, dry at 6,173 ft.

San Patricio County: Coastal Refineries, Inc. and Henshaw Bros. 1 Harry T. Knight et al, Sec. 21, 3 mi. NE of Edroy, dry at 6,475 ft.

Webb County: Standard Oil Co. of Ohio 1 R. V. Martin Ranch, Share 3, Sec. 383, Blk. 11, 5 mi. E of Encinal, dry at 5,460 ft.

TEXAS GULF COAST

Lissie Pool Extension Producing Condensate

HOUSTON.—Edwin Nielsen et al 1 Winnie Poole, extension test at Lissie in Wharton County, was completed last week as a dual gas, gas-condensate well in perforations in the 6,400 and 6,600-ft. sands. This test is on GH&M Survey 25, Abstract 156, about ½ mile west of Salt Dome Oil Corp.'s gas-condensate well. Dual completion was as follows: Upper sand perforated 6,444-48 ft. and 6,468-72 ft., flowed 3,000,000 cu. ft. gas daily on ¼-in. choke, casing pressure 1,800 lb., lower sand perforated 6,602-06 ft., flowed 10 bbl. of 55-gravity condensate daily on 3/16-in. choke, tubing pressure 2,000 lb., gas-oil ratio 225,000 to 1. Total depth is

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7,204 ft. with 6½-in. casing set at 7,17[illegible] ft.

Sun Oil Co. 12 Broussard & Hebert, a new producer in B. Blackman League, at LaBelle field in Jefferson County, flowed potential of 335 bbl. per day from sand topped at 6,965 ft., tubing pressure 675 lb., gravity 34.3°, no water, gas-oil ratio 246 to 1, through 3/16-in. choke. Plugged back depth is 6,983 ft.

Humble Oil & Refining Co. 1-B L. L. Scharff, on the Harris County side of the Katy field, is still testing in perforations in the 6,800-ft. sand and is flowing 4.71 bbl. fluid per hour on ⅛-in. choke of which 2.45 bbl. per hour is oil. The gas-oil ratio is 1,936 to 1, oil gas-oil ratio 3,774:1. Tubing pressure 1,400 lb., casing pressure 2,300 lb., gravity 41.1, 48 per cent salt water.

Humble is recompleting 16 Katy Unit, in Fort Bend County, and southeast extension at the Katy field. New perforations were made with 100 holes from 7,254-64 ft., 2½-in. tubing set at 7,268 ft. and the well is cleaning gas on ⅜-in. choke, tubing pressure 2,100 lb., casing pressure 2,474 lb.

British-American Oil Producing Co. is retesting 1 Ed Hurta et al, new sand discovery at Needville field in Fort Bend County. It is running new test in perforations from 6,025-29 ft. after making squeeze job to shut off water which came in from above on the first test. It is now cleaning on 5/32-in. choke, flowing 2.7 bbl. per hour, about ½ per cent wash water and mud, no salt water, gas-oil ratio 950:1, tubing pressure 950 lb.

UPPER GULF COAST WILDCAT COMPLETIONS

Brazoria County: E. Cockrell 2 Seaburn Estate, heirs, Jared E. Groce 5 League grant, 11 mi. SW of Angelton, dry at 5,033 ft.

Chambers County: Humble Oil & Refg. Co. 2 M. E. Mayes, Smith Point area, dry at 10,025 ft.

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AMERICAN HEAVY-DUTY ROLLER BEARINGS

OHIO, KENTUCKY

Sandyville Gas Pool Extended 2 Miles North

COLUMBUS.—The Sandyville field was extended 2 miles north by Hanley & Bird 1 Charles C. Ream, Section 27, Canton Township, Stark County. Clinton at 4,685 to 4,710 ft. gaged 500,000 cu. ft. and sand, at 4,733-44 ft. had a showing of oil. The well was shot and shut in at 1,630,000 cu. ft.

Hanley & Bird completed a 3,535,000-cu. ft. gas well in the LaGrange pool, Lorain County on Frank Dushenske fee, Lot 83. Drilling was stopped at 3 ft. in the sand at 2,347 ft.

A 1,950,000-cu. ft. well in the south end of the Hinckley pool was completed in Clinton at 3,321-58 ft. by the Ohio Fuel Gas Co. on Noble Stuart fee, Lot 93.

Allen Willey completed a 75-bbl. producer on W. H. Ashcraft, Section 14, Pike Township, Coshocton County. Two offsets to the well have been staked.

OHIO WILDCAT COMPLETIONS

Hocking County, Marion Township: Northern Ordnance 1-C J. H. Graffis, Sec. 13, Clinton, 2,727-2,46 ft., dry, TD 2,746 ft.

Holmes County, Salt Creek Township: Northern Ordnance 1 D. J. Miller, Lot 14, Clinton, 4,030-58 ft., dry, TD 4,136 ft.

Stark County, Canton Township: Hanley & Bird 1 Charles C. Ream, Sec. 27, Clinton 4,685-4,744 ft., 1,630,000 cu. ft., TD 4,744 ft.

WESTERN KENTUCKY

OWENSBORO.—A new Cypress sand pool in Henderson County appeared to be in the making as National Associated Petroleum Co. 1 Maude Rudy, SW SE SE 4-O-23, 6 miles southwest of Henderson, had Cypress sand at 2,246-51 ft., and on drill-stem test recovered about 1,400 ft. of clean oil and 28 ft. of oil-cut mud. The test is 2½ miles from the nearest production.

WESTERN KENTUCKY WILDCAT COMPLETIONS

Edmondson County: Harper & Rhodes 1 Hattler, SE NE NW 11-H-40, dry, TD 1,336 ft., Beaver sand 997-1,034 ft., Chattanooga 1,095-1,187 ft., Devonian 1,187 ft.

Daviess County: R. A. Reilly and J. C. Barnett 1 Hamilton, center north line 9-P-27, near Stanley, 20 bbl. per day, TD 1,500 ft., upper Glen Dean 1,318-48 ft., Golconda 1,404 ft.

Henderson County: Sun Oil 1 Overfield, NE¼ 1-N-22, 1½ miles SE Dixie, dry, TD 2,723 ft., Glen Dean 1,985 ft., Barlow 2,267 ft., Renault 2,451 ft., Ste. Genevieve 2,573 ft.

Webster County: Carl Seneff 1 Clark-Mitchell (T. Page Sur.), 9-L-21, SE cor. farm, 124 bbl. per day, TD 1,026 ft., Pennsylvanian sand 1,004 ft.

EASTERN KENTUCKY

ASHLAND.—The Kentucky West Virginia Gas Co. completed 5,531 Charles Bartley, on Shelby Creek in Pipe County, at 3,296 ft. in shale with a daily open flow of 827,000 cu. ft. of gas.

The same company also completed 5,546 Henry E. Stewart, Hall Fork of Frazier Creek in Floyd County at 1,255 ft. in Salt sand with open flow of 805,000 cu. ft. of gas daily.

INDIANA

EVANSVILLE.—Ashland Oil & Refining Co. et al 2 Mann, Posey County, 530 ft. from north line and 330 ft. from west line of NE NW 5-7s-14w, flowed 800 bbl.

in 24 hours from the Waltersburg sand at 2,096-2,110 ft., the best completion of a week in which four oil wells and five dry holes were finished.

ILLINOIS

Jefferson County Wildcat Holding Up on Pump

CENTRALIA.—A. A. Cameron 1 Bizot, successful wildcat completion in NE NE NW fractional section 20-1s-2e, Jefferson County, recently completed in the Benoist sand at 2,054-62 ft., pumped 157 bbl. per day on the seventh day after being put on pump and has not been shot.

Shell Oil Co. 1 Davis, Jefferson County wildcat, NW NE NE 23-4s-3e, appears to be dry after drilling 3 ft. in the St. Louis lime, top of which is reported at 3,184 ft. Elevation is 467 ft.

Wildcat completions dropped off this week after last week's fairly heavy list, only two completions being registered, both dry. Field completions totaled 32, of which 23 were producers and 9 were dry. New operations reported for the week totaled 40, including 2 new wildcats, both in Clay County, Magnolia Petroleum Co. 1 Iffert, NE NE SE 27-5n-8e, and Texas Co. 1 Rose, NW SE NE 10-5n-5e. Drilling permits granted totaled 66, indicating no let up in the drilling pace.

ILLINOIS WILDCAT COMPLETIONS

Jasper County: Ohio Oil 1 Bunton, NW SW NE 24-7n-9e, dry, TD 3,100 ft., Glen Dean 2,363 ft., base Barlow 2,527 ft., Ste. Genevieve 2,838 ft.

Jefferson County: W. L. Topf et al 1 Crouch, SE SE NE 1-2s-4e, dry, TD 3,127 ft., lower Glen Dean 2,524 ft., Barlow 2,632-44 ft.

WILDCAT COMPLETIONS AND DISCOVERIES

	Week ended August 26, 1944					Cumulative total, 1944				
	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
Ohio	0	0	1	2	3	0	0	12	45	57
Indiana	0	0	0	0	0	3	0	0	18	21
Illinois	0	0	0	2	2	22	0	0	213	235
Kentucky	2	0	0	2	4	9	0	0	54	63
Michigan	0	0	0	3	3	8	0	2	163	173
Kansas	1	0	0	17	18	36	0	5	283	324
Nebraska-Missouri-Iowa	0	0	0	0	0	1	0	0	9	10
Oklahoma	1	0	0	4	5	40	0	18	169	227
Texas:										
North Central	2	0	0	13	15	45	0	1	205	251
West	1	0	0	3	4	21	0	3	113	137
Panhandle	0	0	0	1	1	0	0	1	8	9
Eastern	0	0	0	0	0	5	0	1	84	90
Gulf Coast	0	0	1	4	5	26	9	13	154	202
Southwest	0	0	0	4	4	18	4	14	155	191
Total Texas	3	0	1	25	29	115	13	33	719	880
Louisiana:										
Northern	0	0	0	1	1	3	0	0	37	40
Southern	0	0	0	0	0	5	6	0	35	46
Total Louisiana	0	0	0	1	1	8	6	0	72	86
Arkansas	0	0	0	5	5	2	1	0	41	44
Mississippi	0	0	0	0	0	2	0	0	46	48
Alabama-Georgia-Florida	0	0	0	1	1	2	0	0	13	15
Montana	0	0	0	3	3	3	0	1	27	31
Wyoming	1	0	0	0	1	11	0	1	13	25
Utah	0	0	0	1	1	0	0	0	1	1
New Mexico	0	0	0	1	1	4	0	3	38	45
California	0	0	0	3	3	4	0	5	133	142
Total United States	8	0	2	70	80	272	20	81	2,078	*2,451
Total previous week	9	0	3	65	77					

*Includes 24 Colorado wildcats.

SOUTH LOUISIANA

Oil Discovery Scored in St. Charles Parish

NEW ORLEANS.—Principal development in South Louisiana was the opening of a new oil field in the Good Hope area of St. Charles Parish by the Pure Oil Co. at the 1 General American Transportation Corp. in 7-12s-8e. With total depth of 10,171 ft., 5½-in. casing set at 7,919 ft., drilled out to 7,845 ft., pipe was perforated from 7,830-38 ft. and the well flowed at the rate of 150 bbl. daily of 35.8-gravity oil on 7/64-in. choke. Tubing pressure was 1,250 lb. and 2½-in. tubing was set at 7,792 ft.

Gulf Refining Co. 9 Delta Securities Co., Inc., 63-18s-21e, is another good well for the Bully Camp field in LaFourche Parish, and further enhances major possibilities of this field. Drilled to total depth of 6,650 ft., perforations were made with 84 holes from 6,406-20 ft., and the well flowed 314 bbl. day on 5/32-in. choke, tubing pressure 1,050 lb., casing sealed.

Union Sulphur Co. 3 J. P. Gueno, Section 51-8s-2e, at Branch in Acadia Parish, is preparing to perforate in an oil sand below 11,000 ft. for production test. Well was drilled to total depth 11,316 ft., and found sand showing oil at 11,044-104 ft. and 5½-in. liner was set from 10,478-11,125 ft. for testing.

Pan American Oil Co. 4 Crowell, 27-3s-1w, at Pine Prairie, Evangeline Parish, ran test in Sparta zone perforations at 9,580-9,610 ft., flowed 3½ bbl. hour, 3 per cent mud, on ¾-in. choke. It will be drilled out for a test in the Wilcox. Total depth is 10,676 ft., with 5½-in. casing set at 10,672 ft.

Continental Oil Co. 1 Cromwell, 19-4s-1w, northwest side of Reddell field in Evangeline Parish, flowed potential of 130 bbl. of 55.6-gravity condensate per day from 96 perforations from 9,416-34 ft., total depth 9,674 ft.

MISSISSIPPI

California Co. Opens New Pool in Lincoln County

JACKSON.—A new pool was assured for Lincoln County as The California Co. 1 Douglas, NE SE 10-6n-8e, about 5 miles southeast of the town of Brookhaven, began flowing clean oil from the Massive sand of the Tuscaloosa. After early, sometimes conflicting rumors, the company announced that the well was flowing at the rate of 374 bbl. per day of 38.1° gravity oil through a 5/32-in. tubing choke, gas-oil ratio 440 cu. ft. per barrel, tubing pressure 1,075 lb., casing perforated from 10,520-60 ft. with 238 shots, sand record 10,522-58 ft.

The Texas Co. 1 Odom, a wildcat in Washington County, Alabama, SE SE 27-4n-3w, is reported dry at 8,235 ft., elevation 274 ft. In Decatur County, Georgia, H. L. Hunt 1 Metcalf, a wildcat in the center of northeast quarter of Land Lot 260, is reported dry at 6,200 ft.

ALABAMA WILDCAT COMPLETIONS

Mobile County: Charles Sykes 1 Stafford, NW NE 24-7s-3w, dry, TD 4,744 ft.

NORTHERN LOUISIANA WILDCAT COMPLETIONS

Sabine Parish: Lyons & Prentiss 1 4-L C, approx. SW NE NW 25-6n-12w, dry, T.D. 4,120 ft.

ARKANSAS WILDCAT COMPLETIONS

Ashley County: Union Producing 1-F Crosett, SW SW 24-19s-7w, dry, TD 5,413 ft.

Ouachita County: Lechner & Hill 1 Reynolds, NE NE SW 21-14s-17w, dry, TD 3,701 ft.

Union County: Youngblood & Foree 1 Smith estate, NE NE 30-17s-14w, dry, TD 4,000 ft.

Lion Oil 1 Nick, NE NE 5-18s-14w, dry, TD 6,860 ft.

Yell County: Lion Oil 1 McClure, SW SE 19-7n-21w, dry, T.D. 4,705 ft.

LEGAL

Sealed bids for the leasing of the right to prospect, extract, pipe, store and remove oil and natural gas from 815.12 acres of State reforestation area lands in Steuben County, N. Y., more particularly described as Steuben Reforestation Area #10, Proposals A.B.C.D.E., all, and Proposal F. subject to an outstanding one-third interest, if any, in oil, gas and mineral rights, located in the Town of Bath, Steuben County, will be received at the office of the Conservation Commissioner, 488 Broadway, Albany 7, N. Y., until 2:30 PM (EWT) on September 25, 1944. Bids must be submitted in sealed envelopes endorsed on the outside with the name of the bidder and the following: "Proposal for oil and gas privileges on State land in Steuben County, N. Y., to be opened at 2:30 PM (EWT) September 25, 1944." These privileges will be leased to the highest bidder in accordance with the terms of Section 60-b of the Conservation Law and of the standard oil and gas lease of the State of New York. Copies of this lease will be furnished to prospective bidders upon application. Official maps of the Conservation Department showing the location of the lands to be leased may be seen at the office of the Conservation Department, Albany, and at the office of District Forester I. S. Bowlby, 34 Liberty St., Bath, N. Y. Bidding for these privileges will be upon the royalty per thousand feet for gas, in addition to which an annual rental of 25c per acre will be required and also one-eighth of the market value of any oil produced. Bids must be accompanied by a certified check or cash deposit in the amount of the annual rental, which will be credited to the successful bidder upon execution of the lease. Deposits of unsuccessful bidders will be returned. Successful bidders will be required to give a bond of $5,000 for faithful performance of the terms of the contract. The Conservation Department reserves the right to reject any and all bids. JOHN A. WHITE, Conservation Commissioner.

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(The right address for you to call will be found on Page 302.)

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Among the

Drilling Contractors

John H. Melvin, treasurer and geologist of **Pennsylvania Drilling Co.**, is visiting company operations in the Southwest, and is making his headquarters at Carlsbad, N. M.

Century Drilling Co. has moved to Carmi, Ill., with A. W. Hutchings in charge of activities.

Olson Drilling Co. was drilling below 4,000 ft. on its contract for Pure Oil Co. 1 Ridling, in SW SW NE 8-8n-18w, east of Sentinel, in Washita County, Oklahoma.

W. de Koch, of Vermilion and Edmonton, Alta., has outfit rigged to drill 1 Skeet, in NW LSD 4, 35-49-1w4, in the Lloydminster field, eastern Alberta.

General Petroleums, of Calgary, Alta., has spudded 1 Grand Bend Oils in SE LSD 4, 28-52-3w4, north of the Vermilion field, and has contract for another well for the same company offsetting 1 Holly in the Vermilion field.

Manning & Brown, Inc., Denver, Colo., has been awarded drilling contract on the Southern Union Production Co. 9 Barker Creek, in SE SE NW 21-32n-14w, in northwest New Mexico. Contractor is moving in heavy rotary tools from the Cisco field in Utah for the 10,000-ft. test.

Comet Drilling Co. of Texas, with operating headquarters at Tyler, has two rigs running in West Texas, and plans for expansion in the near future include drilling in East Texas and the Gulf Coast territory. This is a newly organized company, headed by R. C. Johnston, who recently resigned as vice president and director of **Delta Drilling Co.** after 12 years of service.

Howard Drilling Co., Taft, Calif., is working on a contract calling for completion of several wells in the Elk Hills pool. The company was formed recently by Chester I. Garlinger and J. W. Van Atta as a co-partnership.

Baker Drilling Co., Los Angeles, has been reorganized with plans calling for operations on an expanded scale. Individuals interested in the reorganization are J. T. Baker, George H. Johnson, Thomas Blandi, A. N. Petty and Lloyd F. Spears.

Portable Drilling Co. has the drilling contract on the R. E. Havenstrite 3 Hull, in SE NW SE 11-18n-4w, Logan County, Oklahoma. Tools are being moved in.

Drilling & Exploration Co., which has finished several wells at Paloma for the Paloma Operators Committee during the past few weeks, will have two additional wells ready for a production test within the next few weeks.

Helmerich & Payne, Inc., Tulsa, has the drilling contract on the Texas Co. 1 Taunton, in NW NE NW 22-2s-35w, Hitchcock County, Nebraska, 1½ miles southwest of the town of Stratton. The test will be drilled to 5,000 ft., or the Arbuckle lime. Derrick is erected, and contractor was moving in tools.

Beacon Drilling Co. was moving in materials to location for the Sinclair Prairie Oil Co. 1 Perkins, in C SE NW 11-9n-24w, Beckham County, Oklahoma. This will be a deep test. It is southwest of Sayre, and between the Sayre and Erick gas fields.

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OKLAHOMA

W. Edmond Now Has 124 Producing Wells

COMPLETIONS at the end of the week brought the West Edmond field's total number of producing wells to 124, although pipe line runs were made from only 117 wells during the week. Production for the week was 22,300 bbl. per day from 117 wells compared to 20,400 bbl. from 110 wells last week.

The water level on the southwest side of the field in the area south of the probable fault that seems to run approximately east-west along the north line of Sections 31, 32 and 33-14n-4w, is being determined by dry holes and edge wells showing water.

There are now 102 drilling rigs active in the field with others scheduled to be brought in over the next few weeks, as the number of proven and semiproven locations to be drilled ranges from a pessimistic estimate of 400 to an optimistic estimate of 700.

Cleveland County.—Prospects of Hunton lime production in the West Moore pool from wells that failed to get Wilcox production looked dim as Sinclair Prairie Oil Co. 1 Theimer, NE SE SW 20-10n-3w, was a failure in the Hunton and Mid-Continent Petroleum Corp. 1 Harris "B," NE NE NW 32-10n-3w, does not look promising on preliminary tests.

Garvin County.—Three wildcats were being watched closely in this county. Edward J. Kubat 1 Dixon, NE SW SW 9-3n-1e, which had all the earmarks of a producer on drill-stem test, has set pipe, perforated and is preparing for a test. Sinclair Prairie seems to have definitely opened a low-gravity shallow pool in its 1 Allred, NW SE 20-3n-3e, from an unidentified sand at 1,897-1,909 ft. The well swabbed 155 bbl. of 26° gravity oil in 24 hours. Rotary rig has been moved to the north offset and well will be completed with cable tools, after drilling deeper to test sand thickness. W. A. Delaney, Jr. 1 Burks, NW NW NE 31-4n-3e, southwest of Stratford, reported an unexpected show of oil and gas in sand at 1,887-1,910 ft., but four attempts to take a drill-stem test failed to get a shutoff and will be continued to contract depth and back up for later tests.

OKLAHOMA WILDCAT COMPLETIONS

Hughes County: Sunray et al 1 Hanjo, SE SE SW 12-8n-9e, dry, TD 3,565 ft., Cromwell 3,444 ft.

Marshall County: Texas 1 Little, SE NW SW 19-8s-6e, dry, TD 7,901 ft.

Okfuskee County: Discovery. Doak & Hughes 1 Long, SE NW SW 17-12n-10e, pumped 100 bbl. per day, TD 3,195 ft., pay zone 3,175-83 ft., Cromwell 3,175 ft.

Osage County: Phillips 1, NE NE SW 7-23n-4e, dry, TD 4,315 ft., Arbuckle 4,259 ft.

Pottawatomie County: Skelly 1 Billington "B," NW NW NW 17-6n-3e, dry, TD 4,703 ft., Viola 4,280 ft., Trenton 4,345 ft.

CALENDAR

September

A.C.S., 1944 fall meeting, Pennsylvania Hotel, New York, September 11-15.

N.P.A., annual meeting, Hotel Claridge, Atlantic City, N. J., September 20, 21, 22.

October

American Association of Oilwell Drilling Contractors, Blackstone Hotel, Fort Worth, October 3-4.

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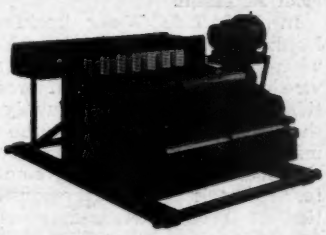

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PERSONALS

South Penn's Head Active in Getting Oil to Coast

GEORGE J. HANKS, of Bradford, Pa., new president of South Penn Oil Co., has been an active figure during the war in the task of moving to the Atlantic seaboard the greatest possible volume of crude and its products. For 30 years Hanks was with Tide Water Associated Oil Co. He resigned last May as vice president and director to join South Penn as vice president and director. He was advanced to the presidency to succeed the late Noel Robinson.

In 1933 Tide Water transferred Hanks from Bradford to New York, where 3 years later he was named vice president in charge of production, transportation and supply for the eastern division. In 1940 he was made a director and appointed vice chairman of the operating committee. He took over the responsibilities of production and pipe-line operations in the Bradford field in addition to supervising the fleet of eastern tankers and the Mid-Continent pipe-line system. To him is accorded much of the credit for developing means of transporting oil to the East Coast to meet demands created by the war.

Hanks was active in organizing Bradford Transit Co., and he retains his position as president and director of that concern.

Paul E. Kuhl has resigned as associate manager of Standard Oil Development Co.'s process division to become assistant manager of the Baltimore and Charleston refineries of Standard Oil Co. of New Jersey. **Norval F. Myers,** assistant manager of the division, was made associate manager to succeed Kuhl. **Dr. A. P. Hewlett,** laboratory director, was promoted to assistant manager. **Robert M. Shepardson,** in charge of thermal and catalytic process operations, was moved up to Doctor Hewlett's former post.

E. L. Davis, on leave from The Texas Co. since 1941, has been appointed director of production for District 5 Petroleum Administration for War, succeeding **Lawrence Vander Leck,** who recently retired to enter the consulting field. **Charles E. Heyns,** of Los Angeles, has been appointed district director of distribution and marketing for District 5, succeeding **C. B. Garretson,** who resigned to reenter private business.

Guido Pigott, formerly in Tulsa, has been made district geologist for British American Oil Producing Co.'s Permian Basin district, with headquarters in Midland, Tex. **Walter Sartain,** formerly in Houston, is district engineer and superintendent. **Orville Wall,** formerly in the Illinois fields, is production superintendent.

Dr. Nero Passos, chief engineer for Brazilian Petroleum Council, is to arrive in the United States early in September for a tour of oil fields and equipment manufacturing plants. He will be a guest of **J. E. Brantly,** president of Drilling & Exploration Co., Dallas, while in this country.

Cyrus C. Robbins, Tulsa, has resigned as appraisal engineer for The Carter Oil Co. to enter the consulting field. Robbins, a graduate of Wisconsin Institute of Technology, was in Carter service 10 years.

Merle Williams has joined the geological staff of Seaboard Oil Co. at Midland, Tex., to work with the company's new geologist for the West Texas district, **Surce J. Taylor.** Williams formerly was scout for the University Lands office.

John H. Loudon, who was an assistant general manager of Caribbean Petroleum Co. in Caracas, Venezuela, has been made general manager. He replaces **B. Th. W. van Hasselt,** recently elected a managing director of the Royal Dutch Shell Group. Loudon was born in Holland in 1905. He joined the Royal Dutch Shell Group at The Hague in 1930. Two years later he was assigned to Shell Oil Co. in the United States. Prior to his appointment to Caracas in 1937, Loudon was with Shell Oil Co. of California.

J. G. Sloan, who was district superintendent of the North Crowley district, Louisiana, for Humble Oil & Refining Co., has been promoted to assistant division superintendent, in the Louisiana division office, New Orleans. He is succeeded at North Crowley by **J. I. Cochran,** formerly district superintendent at Paradis, La. Cochran's position at Paradis has been filled by **Alfred J. Cheney,** transferred from the Anna district, Natchez, Miss. **James I. Tuttle,** district superintendent, has been transferred from the Colorado district, Randado, Tex., to the Scott and Hopper district, Falfurrias, Tex. **John B. Payne** has been transferred from the Sunniland district, Everglades, Florida, to the Bayou Sale district, Franklin, La., as district superintendent. **Sam F. Moore** has been transferred from the Greta district, Refugio, Tex., to the Scott and Hopper district as district chief clerk.

K. C. Vaughn has been appointed district superintendent in the Valley division, production department, for Union Oil Co. of California, succeeding **W. J. Larson,** who recently became acting manager of field operations.

Paul F. Sullivan, scout for Ashland Oil Refining Co., has been transferred from Evansville, Ind., to Carmel, Ill.

Ralph C. Hart, who was an independent oil operator in Fort Worth and who is now a staff sergeant with the Persian Gulf Command in Iran, writes that temperatures range from 110 to 130 in the shade and from 140 to 185 in the sun. "We work day and night except from 12 noon until 5 p.m., when it is too hot to work or sleep."

C. R. Clark has joined the staff of Lake Oil Co., Ada, Okla., as geologist and landman. Clark was with Illinois Geological Survey 4 years and for the past 16 years has been with Gulf Oil Corp. He is a University of Illinois graduate.

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MARKET QUOTATIONS

Prices as of August 29, 1944

(This service is abbreviated because most refinery products are selling at the Government's price ceilings. Quotations on other products than those shown here furnished on request. Quotations are f.o.b. plant in tank cars and in cents per gallon.)

REFINERY GASOLINE

Octane (A.S.T.M.):	80†	70-74
Mid-Continent*	6.00-6.25	5.875
Gulf Coast	6.00-6.50	‡5.750-6.125
Northeast Coast	9.80	9.075
California		6.255-6.375

*Basis Oklahoma Group 3. †1939 C.F.R. (research method.) ‡Unleaded.

NATURAL GASOLINE

Grades:	25-70	10-55
Oklahoma (Group 3)	4.750	5.700
North Texas	4.375	5.250
North Louisiana	4.375	5.250
California	4.875	5.500

CRUDE-OIL PRICES

Representative posted schedules per bbl.	
East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas	1.08

Note: Exclusive of subsidy.

A.P.I. REFINERY REPORT

Week ended August 19, 1944

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	161	3,571	498	778
Ind., Ill., Ky.	799	17,718	4,349	5,943
Okla., Kan., Mo.	385	6,652	1,422	1,834
Censored area*	2,468	38,226	18,106	21,387
Rockies	107	2,068	672	357
California	774	13,615	33,690	10,009
Total 8-19-44	4,694	81,850	58,737	40,308
Total 8-12-44	4,560	81,203	57,003	40,035
Total 8-21-43	4,046	72,815	66,724	37,464

*Reports combined on East Texas Coast, Texas Gulf Coast, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl.
August 19, 1944	223,040,000
August 12, 1944	223,597,000
August 21, 1943	236,486,000

*Excludes unrefinable California stocks.

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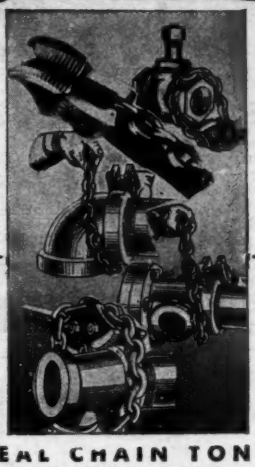

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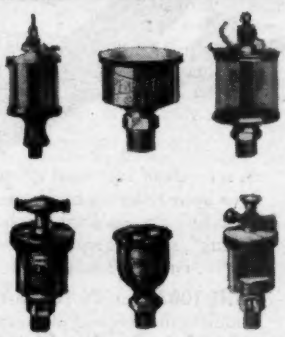
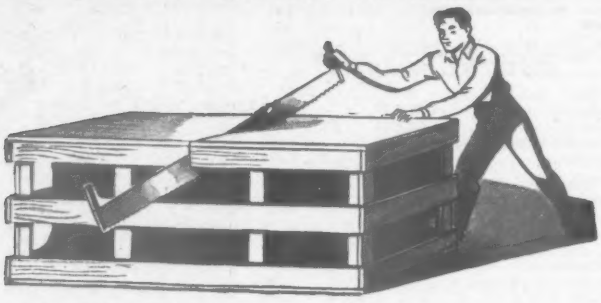


Glass body oilers, sight feed lubricators. Plain oil and grease cups, spring compression and screw plunger grease cups, engine lubricators . . . these are among the Penberthy lubricating devices that are so widely used in the oil industry because they have always been dependable under the most severe conditions.

PENBERTHY INJECTOR CO.

DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

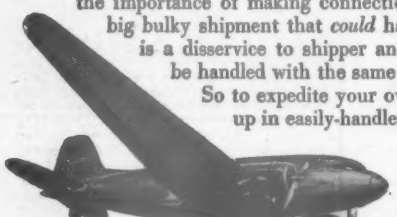
For faster handling by AIR EXPRESS



divide bulky shipments

into smaller units

THE handling, loading, and unloading of AIR EXPRESS shipments is a speedy operation. Crews are well-trained and skillful. They know and appreciate the importance of making connections, quick delivery. That is why a big bulky shipment that *could* have been broken into smaller units is a disservice to shipper and receiver alike. It simply cannot be handled with the same speed given to ordinary shipments. So to expedite your own shipments be sure they're made up in easily-handled units whenever possible.



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As a result of increased efficiency developed to meet wartime demands, rates have been reduced. Shippers nationwide are now saving an average of more than 10% on Air Express charges. And Air Express schedules are based on "hours", not days and weeks — with 3-mile-a-minute service direct to hundreds of U.S. cities and scores of foreign countries.

WRITE TODAY for "North, East, South, West"—an informative booklet that will stimulate the thinking of every executive. Dept. PR-9, Railway Express Agency, 230 Park Avenue, New York 17, N. Y., or ask for it at any local office.

AIR EXPRESS

Gets there FIRST

Phone RAILWAY EXPRESS AGENCY, AIR EXPRESS DIVISION
Representing the AIRLINES of the United States

West Central Texas

(Continued from page 82)

mented 7-in. pipe at 2,373 ft. and were preparing to test through tubing. Its flow through open hole was estimated between 50 and 75 bbl. per hour.

Stephens County.—Sinclair Prairie Oil Co. 16-A Atkins, wildcat 6 miles east of Crystal Falls, in Block 2, SPRR Survey, on potential test flowed 168 bbl. of oil in 3 hours through ¾-in. choke, from Mississippian lime pay opposite perforations at 4,245-90 ft., total depth 4,305 ft.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Callahan County: Anzac Oil Co. et al 1 W. P. Brightwell, Victoria CSL No. 202, 9 mi. W Cross Plains, elev. 1,702 ft., Gardner sand 2,460 ft., gray sand 2,883 ft., dry, TD 2,955 ft.

Jones County: Clark & Cowden 1 Mrs. Jane Hoyt, Sec. 24, Blk. 15, TPRR Sur., 4 mi. NW Hawley, elev. 1,728 ft., lime show oil 2,100-08 ft., Gunsite lime water 2,570-80 ft., dry, TD 2,588 ft.

Phillips Petroleum Co. 1 Mildred, A. Jones Sur. No. 114, 6 mi. NE Avoca, elev. 1,498 ft., Palo Pinto lime 3,323 ft., TD 3,400 ft.

Stephens County: Carey & Carey 1 B. W. King and J. G. Wootten, Sec. 1,088, TE&L Sur., 6 mi. NE Ivan, elev. 1,103 ft., Caddo 3,360 ft., Marble Falls 4,007 ft., dry, TD 4,093 ft.

Northern Ordnance, Inc. 2 S. T. Robertson, Sec. 1,152, TE&L Sur., 1 mi. SE Crystal Falls, elev. 1,128 ft., Palo Pinto 1,340 ft., Capps 2,200 ft., Ellenburger 4,360 ft., Caddo 3,245 ft., dry, TD 4,666 ft.

Premier Oil & Refg. Co. of Texas et al 1 S. G. Tomlinson et al, NE/4 Sec. 453, SPRR Sur., 18 mi. S Breckenridge, elev. 1,410 ft., Strawn sand, no show oil or gas 1,985-90 ft., dry, TD 2,210 ft.

Rocky Mountain Area

(Continued from page 83)

100 ft. lower, is showing up better in the Embar than in the wells in the same horizon drilled to the west of the axis.

General Petroleum to complete Clark's Fork well.—General Petroleum Corp. has contracted with the Resolute Oil Co. to take over and complete 1 Government, C NW NW 25-9s-22e, Clark's Fork structure, Carbon County, Montana, drilled to 4,212 ft. last year by Northern Ordnance, Inc., but which did not reach the objective. Drilling will be resumed to go to the Frontier and Dakota at 6,500 ft.

WYOMING WILDCAT COMPLETION

Spindletop, Natrona County: Wyalta Oil Co. 1-D Government, SE SE SW 32-30n-8w, TD 2,445 ft., 5½-in. 2,385 ft., perf. 28 holes at 2,250-68 ft., swabbed 640 bbl. 16-gravity black oil from Tensleep, top Sundance 1,260 ft., Embar shale 1,865 ft., Embar lime 1,890 ft., Tensleep 2,224 ft.

MONTANA WILDCAT COMPLETIONS

Midway, Pondera County: R. C. Tarrant 1 Berland, NW NW NW 2-27n-1w, TD 1,590 ft., Sunburst 1,575-90 ft., no shows, plugged and abandoned.

Pendroy, Teton County: Jarvis, Marcelle, Taylor 1-B Reed, SW SW NE 8-27n-5w, TD 2,860 ft., Ellis-Madison 2,500 ft., show in second break in lime, plugged and abandoned.

Sunburst Block, Toole County: Texas Co. 1 Goeddertz, NW NE SE 19-36n-2w, TD 1,898 ft., Sunburst 1,648-50 ft., Ribbon sand 1,877-95 ft., Madison 1,893-98 ft., dry and abandoned.

UTAH WILDCAT COMPLETIONS

Cisco, Grand County: Continental Oil Co.-Union Oil Co. of California 1 Cisco Unit, TD 4,744 ft., 400 ft. in granite, Moenkopi of Triassic age at 4,000 ft., followed by arkose, dry and abandoned.

Industrial Items

Culley Sales Engineer for Buda Engine Sales & Service Co.

The Buda Engine Sales & Service, Inc., Tulsa, announces the affiliation of R. S. Culley as sales engineer. Culley, who is better known throughout the industry as "Rod," will have charge of the Diamond Chain department, with distributing outlets in Oklahoma, Kansas, Illinois and Wyoming. Culley was formerly associated with Ohio Oil Co. as assistant manager of the wholesale sales department.

Wingerter Named by Timken

R. G. Wingerter, for the past 6 years an industrial engineer for Timken Roller Bearing Co., has been appointed assistant chief engineer for the industrial division.

Dowell Announces Personnel Changes

Dowell, Inc., has announced the appointment of Jack Sutherlin as district manager for its Fort Worth district, effective in the fall, succeeding F. R. Holland, who recently resigned. Sutherlin has been with Dowell for the past 8 years and is now serving as district manager of its Borger, Tex., district. Prior to this, he had been district engineer for Kansas and research engineer from the company's Tulsa general office. During the interim, Charles E. Mangold, assistant general manager, and H. W. Ross, assistant general sales manager of Dowell, will assume management of the district. Dowell also announces the appointment of Nathan Webb as district manager of its Borger district, succeeding Sutherlin. Webb has been with Dowell for the past 6 years and is now serving as station manager of the Nocona station of Dowell's Fort Worth district.

W. Wray Love has assumed new duties as district manager of Dowell's Salem, Ill., district. He has been associated with the company since 1934 and has worked in nearly every area in which Dowell operates including Alberta, Canada. For the past several years he has been district engineer at Salem. He replaces J. H. Courtner who has taken on new duties in connection with Dowell's expanding industrial chemical division.

Dowell also announces the opening of an Oklahoma City district office at 1350 National Bank Building. L. A. Courter, formerly district manager at Seminole, will be in charge of the new office. Dowell will continue to maintain treating stations and offices at Seminole and El Reno. The Seminole station will be managed by John Mayfield and G. G. "Tiney" McKenney will manage the El Reno station.

New Carbon Dioxide Fire Extinguisher

Randolph Laboratories, Inc., 8 East Kinzie Street, Chicago, Ill., has produced a 25-lb. wheel-type carbon dioxide fire extinguisher that is moved and operated with uninterrupted, single-sweep action. The extinguisher features an exclusive palm-trigger valve, mounted conveniently on the extinguisher steel handle. By grasping the handle, the operator can move the unit and press the release button with one hand—discharging a penetrating, icy blanket of carbon dioxide in a large, sweeping arc—10 to 20 ft.

Release of pressure on the palm-trigger automatically stops the flow of carbon dioxide gas—eliminates twisting of valves and retains the remainder of the charge for repeated attacks.

Flame Priming and Descaling Nozzles

A descaling attachment which is easily attachable to any standard Victor welding torch butt has been introduced by Victor Equipment Co., 844-54 Folsom Street, San Francisco. This flame priming and descaling nozzle is provided with a spiral mixer and gas proportioner to handle the larger gas volumes required for these operations. In order to keep premixed gases below ignition temperatures, an Airadiator aluminum cooling section is incorporated at the nozzle head. The nozzle is made in 4-in. and 6-in. ribbon-flame widths.

International Harvester Names Two Zone Managers

The Industrial Power Division of International Harvester Co. announces the appointment of H. R. Carlson as zone manager for Zones 11 and 19, with headquarters at the International Harvester branch at Dallas. Also announced is the appointment of R. H. White as zone manager for Zones 17 and 18, with headquarters at the International Harvester branch at Tulsa.

Mr. White has been with the Harvester company branches at Oklahoma City and Tulsa since he joined the company in 1935. He has a wide acquaintance in both the construction industry and the oil industry.

U. S. Steel Products Acquires Bennett Manufacturing Assets

United States Steel Products Co., a U. S. Steel subsidiary, has acquired the manufacturing assets of Bennett Manufacturing Co., maker of steel drums. The manufacturing plants of Bennett Manufacturing Co. are located at Chicago and New Orleans. These plants will be operated as the Bennett Manufacturing Division of United States Steel Products Co. Stevens A. Bennett has been appointed a vice president of United States Steel Products Co. in charge of the Bennett Manufacturing Division.

Axelson Mfg. Co. Makes Appointments Permanent

Axelson Manufacturing Co. announces the permanent appointments of K. S. Ramey and J. R. Walker to the management of the California and Mid-Continent sales divisions respectively. These appointments have been held by Ramey and Walker for some time on a temporary basis, pending this confirmation.

LEGAL

Notice of Oil & Gas lease sale: The U.S. Department of Agriculture will award leases on 15 tracts of approximately 2480 acres in Cochran County, Texas, on former Slaughter Ranch. Rent $1.00 per acre Awards limited to 1 tract per lessee. Sealed bids to be publicly opened September 15 Bid forms and additional information can be secured from Ray E. Davis, Acting Regional Director, Farm Security Administration, Old Post Office Building, Amarillo Texas. Permission may be obtained from Mr. Davis for making preliminary geophysical and geological surveys upon written request.

LEGAL

UNITED STATES DEPARTMENT OF AGRICULTURE, Forest Service, Harrisburg, Illinois, August 19, 1944. Sealed bids in triplicate will be received until 2:00 P.M. Central War Time September 25, 1944, and then publicly opened, offering bonus for operating rights in connection with gas and oil leases on land located in the Shawnee National Forest, Gallatin County, Illinois, in Sections 18, 19, and 30, Township 10 South, Range 9 East, Third P.M., totalling 562.47 acres more or less. Award of lease will be made only to bidder who can show sufficient experience and financial resources and prove citizenship. Interested parties may obtain bid documents, lease forms, detailed descriptions, and operating regulations from Forest Supervisor, U. S. Forest Service, Harrisburg, Illinois.

DISTRICT PRODUCTION SUPERINTENDENTS

You are invited to protect sucker-rods, tubing, casing, lines and tanks from hydrogen-sulfide (sour gas) corrosion by the use of—

HYDROGEN (H₂S) SULFIDE NEUTRALIZER CONVERSION CONCENTRATES

NOTE:—When Electrolytic (Galvanic) Currents are present with Hydrogen-Sulfide (Sour Crude): — Alternate *Hydrogen Sulfide Neutralizer* with *NaCl Inhibitor.*

"Save pulling jobs and replacement costs"

The HMS INDUSTRIES, Mid-Continent Division

P. O. Box 365 Tulsa, Okla.

Geophysical Transformers

Sealed against sub-tropical humidity—"Sextuplex Shielding," improved uniformity, minimum size and weight, *plug-in terminal block.

**Also available with terminal lugs.*

GEOPHONE CABLE

Full Line of Geophysical Electronic Supplies

All types Burgess batteries and Agfa developer and hypo in stock for immediate delivery.

HARRISON EQUIPMENT COMPANY

Classified Advertising

HELP WANTED

CHEMICAL engineer with refining experience. Bachelor degree or better. Salary: open. Middle west research institute. Box A-108, The Oil and Gas Journal, Tulsa, Okla.

HEAT Transfer Design Engineer, to be assistant to manager of plant making heat exchangers for chemical process work. Must be capable of rating heat exchangers. Permanent job with good postwar outlook. Address application to R. M. Armstrong. Downingtown Iron Works, Downingtown, Pa. Certificate of availability needed.

WANTED: Petroleum engineer executive under age of 35 to supervise drilling and production, by well-known independent oil company. Must have had wide practical field experience and be familiar with plug backs and secondary recovery methods. Excellent salary and other financial privileges. Give references, education, and experience. Box A-131, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Land man with good geological background, trading ability and "horse sense," by well established progressive independent oil operator. Age preferably under 38 years. Substantial salary with opportunity to make personal investments. Must be familiar with Mid-Continent areas. State experience, education and give references. Box A-130, The Oil and Gas Journal, Tulsa, Okla.

DESIGNERS
DRAFTSMEN
AND
SQUAD LEADERS
For Process Piping on
Oil Refineries.

Applications solicited from men not now employed in essential work or those completing essential work who have Statements of Availability.

ARTHUR G. McKEE & CO
2300 Chester Avenue
Cleveland, Ohio

THE position of Department Superintendent in a large Chemical Company is open to someone with a broad practical experience in organizing and directing large steam, pipe fitting and welding jobs. Applicants must have trade ability as master steam and pipe fitter previous to experience as supervisor of work in maintenance and installations of chemical plants or refineries. Must be thoroughly familiar with high pressure and high temperature steam fitting and modern practice in the fabrication of piping by welding. Only interested in those who have fully demonstrated ability to organize and handle jobs and men. By formal education or extension work must possess engineering ability. Box C-993, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Chief chemist for refinery. Give experience and reference. Box A-118, The Oil and Gas Journal, Tulsa, Okla.

FOREIGN EMPLOYMENT
ARABIAN AMERICAN OIL COMPANY

GRADUATE CHEMICAL ENGINEERS FOR PETROLEUM REFINERY AS WELL AS OTHER HIGHLY QUALIFIED TECHNICAL REFINERY AND OIL-FIELD PERSONNEL required for Arabian American Oil Company's operation in Saudi Arabia. Engineers experienced in petroleum refinery design and operations desirable but not essential. Extensive training on refinery equipment will be provided before leaving the United States. Employment offers splendid opportunities for advancement and post-war security. Good working conditions, hospital and medical care, liberal benefit plans and vacation privileges in the United States. If genuinely interested in a foreign assignment, please send full information covering experience, references, transcript of college record, draft and availability status to our Relations Department, 200 Bush Street, San Francisco 4, California.

HELP WANTED

DRILLING SUPERINTENDENT wanted by Contracting Company in Mid-Continent Area to handle a district working from five to eight rigs. Must be recognized, competent and experienced well man of middle age capable of planning and supervising complete drilling operations. All applications will be treated as confidential. None need apply whose character and ability will not stand a rigid investigation. Box A-134, The Oil and Gas Journal, Tulsa, Okla.

PHYSICIST for investigation of vibrating problems. Ph.D. preferred. Salary: open. Middle west research institute. Box A-107, The Oil and Gas Journal, Tulsa, Okla.

SITUATIONS WANTED

SUPERINTENDENT or assistant superintendent. 18 years refinery experience—cracking, reforming, asphalt. Last 7 years in supervising capacity. Would like connection with small progressive independent. Box A-120, The Oil and Gas Journal, Tulsa, Okla.

ASSISTANT SUPERINTENDENT: 17 years refinery experience. Foreign service. Capable of directing plant operation and maintenance. Furnish best of references upon request. Desire connections of permanent nature in midwest or southwest. Box A-137, The Oil and Gas Journal, Tulsa, Okla.

EXPERIENCED landman, released from army, wants connection with substantial oil company. Any reasonable position acceptable. Address Box C-709, The Oil and Gas Journal, Tulsa, Okla.

COLLEGE GRADUATE with some special work at Colorado School of Mines desires responsible position with substantial concern operating or planning operations in the Rocky Mountain area. Continuously connected with oil industry except for last three years in heavy defense construction since 1919 and since 1922 in Rocky Mountain area. Thoroughly familiar with drilling, cable tool or rotary, and geological conditions in area, all phases of field work. Age 53, health excellent. Box A-117, The Oil and Gas Journal, Tulsa, Okla.

CAN be available to any large company on reasonable notice in the capacity of sales, either industrial or jobber trade, of petroleum products, southern district. Box C-991, The Oil and Gas Journal, Tulsa Okla.

EXPLORATION GEOLOGISTS: Two competent young geologists, A.B., B.S. degrees, graduate work. Six years rounded out practical experience, outstanding work in stratigraphic, structural, surface, subsurface from Arctic Circle to equator. Desire connection with small company where freedom of initiative and ideas can be carried out for the advantage of those concerned. Will consider foreign work. Any company who is interested in us will have to give us freedom to carry out research and exploratory work so that the best results may be obtained. Salaries and contracts open. All replies confidential. Box A-132, The Oil and Gas Journal, Tulsa, Okla.

PRACTICAL MAN, age 45, broad experience over long period with major oil company. Now in department embracing knowledge operation and properties all departments. Desires connection with smaller company. Box A-140, The Oil and Gas Journal, Tulsa, Oklahoma.

EXECUTIVE ACCOUNTANT

Qualified accountant now holding position of general auditor in large organization desires to make change in industry. Training and experience record very broad. Fully able to assume complete responsibility for accounting and production control functions. Would be interested in a connection with progressive oil or manufacturing enterprise.

BOX A-143
The Oil and Gas Journal, Tulsa, Oklahoma

SITUATIONS WANTED

GEOLOGIST with extensive experience surface and subsurface surveys, also stratigraphic investigations, available on one month's notice. Box A-133, The Oil and Gas Journal, Tulsa, Okla.

ROYALTIES

ANDREW J. BARRETT
The Philtower
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SOUTH GEORGIA ROYALTIES. As your agent will buy on commission basis cash or interest carried, interest preferred. C W. Deming, Waycross, Ga.

LANDOWNERS ROYALTIES: Fast action, low prices, on or adjacent to acreage being drilled by major oil companies. Good profit possibilities. Informative booklet free. Landowners Royalties Co., Great Falls, Mont.

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Devoted to the needs and interests of the petroleum industry. Monthly. Subscription price, $10 per year. Sample copy sent on request. Leo C. Haynes, Editor; P.O. Box 1024, Austin 6, Tex.

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CAPITAL SEEKERS—Interested in raising $25,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit 1, Mich.

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PATENTS, Trade-Marks, Booklet, "General Information Concerning Inventions and Patents" and "Free Schedule" sent without obligation. Established 1915. Lancaster, Allwine & Rommel, Suite 418, Bowen Bldg. Washington 5, D. C.

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GEORGIA OIL REPORTS: 6 mo. sub. $6. Get posted. Keep posted. Also Base and County maps So. Ga. and North Fla. C. W. Deming, Waycross, Ga.

LEASES AND DRILLING BLOCKS

FOR SALE: Oil and gas leases in shallow producing territory of Kentucky; on structures and near producing wells. W. P. Harley, Bowling Green, Kentucky.

PROTECTION ACREAGE WANTED
Have client in the market for single leases or spreads around wildcat wells. Address Box C-979, The Oil and Gas Journal, Tulsa, Okla.

NEW MEXICO
State Oil and Gas Leases
Located in the Great San Juan Basin. Oil pools now producing highest gravity crude known. HELIUM discovery. DEEP TEST UNDER WAY. Buy where the majors buy. Write for information. Harry S. Wright Wright Bldg., Farmington, New Mexico.

OWNERS of NW¼, Sec. 16, Twp. 10, R. 22, Graham County, Kansas, next to Stites test well, will consider leasing. Wallin Estate, Vernon Wallin, Agent, Woodhull, Illinois.

BEST BFT in Central Texas, 800 acres semiproven. One well drilled on this block came in for approximately 10 barrels per hour, and produced over 3,600 barrels by Railroad Commission report. Location perfect and under 3,000 ft. in depth. Will sell ½ (one-half) interest. This won't last. No brokers. Klein & Mills, P.O. Box 546, Austin, Texas.

HAVE 6,000 ACRES leases in Morris County, Kansas. Possibilities good for oil or gas well in Bartlesville at 2400'. Will farm out or sell whole block. Address Box 106, Seminole, Oklahoma.

OREGON WILDCATTER wants connection with party able to drill on my land, showing most reasonable geological and geophysical possibilities. Will make exceptional concession. Wm. Ziedrich, Box 396, Coquille, Oregon.

LEASES ROYALTIES

PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma, Louisiana and Illinois.
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RECONDITIONED AND GUARANTEED

Valves and Fittings
Centrifugal—Steam Duplex and Simplex Pumps
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Refinery Equipment Inc.

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Tulsa, Oklahoma

FOR SALE: 72 Beaird Steel Headers, 4" I.D., 2000 lbs. test press; 30 Brewster Steel Headers, 4" I.D., 3000 lbs. test press; 30 B.W.Y. C.R. Headers, 4" I.D., High Pressure. ARROW PETROLEUM CO., Centralia, Illinois.

FOR SALE: 5,000' 4½" OD 16.60# Range 1 drill pipe with regular tool joints; 6,100' 4½" OD, 16.60# Range 2 drill pipe with A.P.I. F.H. tool joints. Also 1 steel drilling rig complete with boilers and drill pipe capable of drilling 6,000'. Wire, write or phone Louisiana Iron & Supply Co., Shreveport, La.

FOR SALE: Good Steam Rotary Drilling Rig, including 2—90 H.P. boilers, 1—19" Johnson Rotary Unitized Draw Works, Twin Pumps, Twin Engines, and 4,900 feet of drill stem. Price $8,000.00. Come and look or write for inventory. Alexander Boynton, 615 Insurance Building, San Antonio, Texas.

FOR SALE: 1—2000 D. D. Franks Double Drum Pulling unit, less motor. 2—8", 50' telescope hydraulic mast poles. Lohmann Construction Co., Inc., Box 231, Griffin, Indiana.

FOR SALE at Oklahoma City: 1—Used 9" x 8½" x 12" F. & M. D.P.P. Steam Pump, 75# W.P., 660 BPH, $250.00. Cities Service Oil, Patridge, Bartlesville, Oklahoma.

CARDWELL RL Rotary 7 x 10 G-D Pump 13000 Cat Butane equipped complete ready for operation, located our Salem, Illinois, store. Iverson Tool Company, Tulsa, Oklahoma.

FOR SALE: Used Orifice and Positive Gas Meters. George R. Milner, Box 457, Okmulgee, Okla.

FOR SALE: 1—7" Roller Bearing Jack Shaft 4 speed Unitized O W S draw works equipped with American Automatic Cat Head. 1—5" Jack Shaft 4 speed Unitized National draw works. 1—6" Square Kelly Joint. All equipment in first-class condition and is located at Kilgore, Texas. Apply Box 711. Longview, Texas.

8⅝" O.D. 28 & 32# Plain end 7500', 4700' 9" O.D. 15# C. & T. Line Pipe, 18" O.D. 2,000' P.E. 58#, all good used Pipe.
A. A. Gilbert Pipe & Supply Co.,
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RADIATORS

ALL MAKES OF ENGINE COOLERS—AUTOMOTIVE, DIESEL AND INDUSTRIAL RADIATORS
Cleaned — Repaired — Recored
Now able to furnish copper cores on all types of radiators
FRANKS RADIATOR SERVICE
1513 E. 11th St. Phone 3-3820
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For Sale
PIPE AND STRUCTURAL STEEL

Air hose ¾" and 1". Suction hose 2½", 3" and 4".
All in good reuseable condition
ALSO NEW hose.

SONKEN-GALAMBA Corp.
Kansas City (18), Kans.

3 COMPLETE steel rig fronts, 40 hp. superior engines. 2—500 bbl. steel bolted tanks. Write, wire or phone, Melton Supply Co., Seminole, or Murray Tool & Supply Co., Tulsa, Okla.

National Transit Vertical Triplex 4½ x 18 Oil Pump 80 HP. Oil Engine. Sale cheap. IVERSON TOOL COMPANY, Tulsa, Okla

APPROXIMATELY 90 wells, etc., in Nowata County, about 600' deep, containing 6¼" casing; 6 wells contain tubing. 1 Model W. Allis Chalmers tubing and rod cleanout machine. 1—1940 Ford pickup. 1—1940 Dodge truck with trailer, good tires. Must be sold all together subject to prior sale $9,500. Box 574, Tulsa, Okla

FOR SALE: Jumbo D Fort Worth spudder and 100 hp. International motor in excellent condition complete with tools. Central States Oil Corporation, P.O. Box 148 Evansville, Indiana.

FOR SALE: Three 122'—537.000# Capacity Drilling Derricks, complete, with substructures; six 96' Parkersburg Derricks. Oil Field Tool & Supply Co. P.O. Box 2581. Phone, Charter 41759. Houston 10, Texas.

42.000 feet 4 inch standard line pipe 11 pounds CT—7.000 feet 8⅝ PE 29 pounds—3.500 feet 3 inch standard CT—4.700 feet 5 inch OD standard line pipe CT. The above racked, located East Texas. A. A. Gilbert Pipe & Supply Co., Shreveport, La.

RAILWAY EQUIPMENT AND ACCESSORIES

We can furnish rails, spikes, bolts, angle bars, locomotives, cranes and other railway material. Also Motors, heavy duty. Write, wire or phone for prices

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STORAGE TANKS

Large quantity available from Tank Cars. 8000 and 10000-Gallon capacities.
Cleaned—Tested—Painted
SUITABLE FOR STORING MOST KINDS OF LIQUIDS!
Whole tank cars too for mobile storage.

Send us your inquiries for other sizes also!

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Used Alloyed Sucker Rods

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Used Engines and Compressors
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Overhead Electric Traveling Crane
Totally enclosed for outdoor service
150 Ton Capacity Main Hoist
2—25 ton each auxiliary hoists
30' span
5 motor, cab controlled, 3/60/440
Each hoist independently operated by means of separate electric control

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Complete line of Rotary Fishing Tools, including Sotco Knuckles, Hooks, Grabs and Sockets. Also some surplus standard Tools. These Tools in good condition. Offered at reduced prices. Me-Tex Supply Company, Hobbs, New Mexico.

FOR SALE

1,000 barrel Skimming or Topping oil refinery complete in every detail Ready to operate. Will sell as a whole or any part. Located Pueblo, Colorado.

Many items of used refinery equipment. Priced lower than ceiling Send us your inquiries.

WANTED TO BUY: Shut down plants or surplus oil refinery equipment.

Brown-Strauss Corporation

Kansas City, 10, Mo. 1402-1740 Guinotte Avenue Phone HArrison 1000

EQUIPMENT FOR SALE

FOR SALE: 42 joints with tool joints 1300 feet 4½ A.P.I. full hole drill pipe. Excellent condition. 85c per foot F.O.B. Shreveport, La. Joe M. Burnham, Ardis Bldg., Shreveport, La.

STAR 45, good condition with tools, generator, blower, wire lines, extra parts. Alfred Cumming. Rt. #1, Bixby, Okla.

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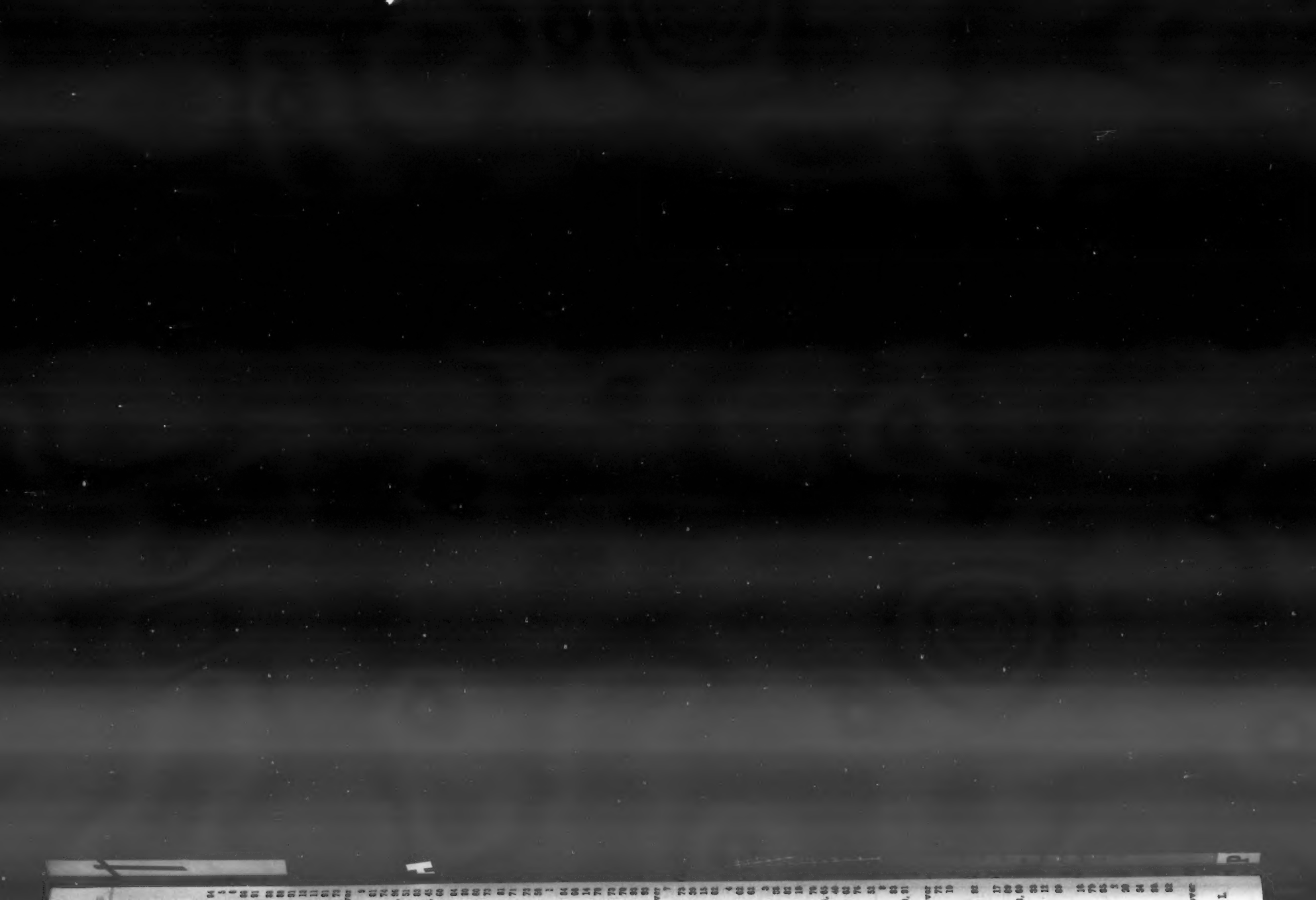
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